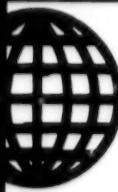


S-TND-90-004  
FEBRUARY 1990



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# **JPRS Report—**

## **Nuclear Developments**

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# Nuclear Developments

JPRS-TND-90-004

## CONTENTS

16 FEBRUARY 1990

### SUB-SAHARAN AFRICA

#### SOUTH AFRICA

- Corporation To Close Uranium-Enrichment Plant /Johannesburg Radio/ ..... 1

### CHINA

- 1990's Prospects for International Chinese Nuclear Energy Development  
/RENMIN RIBAO 10 Jan/ ..... 2  
Song Ping Visits Nuclear Power Institute /XINHUA/ ..... 3

### EAST ASIA

#### JAPAN

- Japan, U.S. Extend Energy R&D Pact 5 Years /KYODO/ ..... 4

#### NORTH KOREA

- Nuclear Plant Reportedly Under Construction /Tokyo KYODO/ ..... 4  
Further Reportage on Nuclear Plant ..... 4  
Warning From South Korea /Seoul YONHAP/ ..... 4  
Pictures of Plant Released /Seoul YONHAP/ ..... 4

#### MONGOLIA

- Radiation Level Reported Normal at Uranium Plant /Ulaanbaatar International/ ..... 5

### EAST EUROPE

#### CZECHOSLOVAKIA

- Radioactive Leak Admitted; Charges Denied ..... 6

#### GERMAN DEMOCRATIC REPUBLIC

- Safety Official Denies Radioactive Leaks /ADN/ ..... 6  
Nuclear Power Plant Expansion Problems Noted  
/Frankfurt/Main FRANKFURTER ALLGEMEINE 22 Jan/ ..... 7  
Government Discusses 1975 Nuclear Accident ..... 8  
Details of Accident Noted /Hamburg DER SPIEGEL 22 Jan/ ..... 8  
Statement Released /ADN/ ..... 9  
Report Issued /ADN/ ..... 9  
Ecology, Nuclear Safety Discussed at Roundtable /ADN/ ..... 9

#### POLAND

- Nuclear Power Plant Construction Reviewed at Sejm Session /PAP/ ..... 10

LATIN AMERICA

ARGENTINA

Flaws in Nuclear Policy Outlined	<i>[LA PRENSA 5 Jan]</i>	11
CNEA Bemoans Loss of Autonomy, Cites Risks	<i>[CLARIN 6 Jan]</i>	12
President of CNEA Outlines Goals for 1990	<i>[Buenos Aires Radio]</i>	13

BRAZIL

Santo Amaro Plant Emits Excessive Radiation	<i>[O ESTADO DE SAO PAULO 10 Jan]</i>	13
IPEN Says Santo Amaro Radiation Level Low	<i>[O ESTADO DE SAO PAULO 12 Jan]</i>	16
Angra I Resumes Operations	<i>[O ESTADO DE SAO PAULO 5 Jan]</i>	16
Congress Authorizes \$200 Million for Angra II	<i>[GAZETA MERCANTIL 4 Jan]</i>	16
Rare Earth Raw Material Exported to Japan	<i>[O ESTADO DE SAO PAULO 4 Jan]</i>	17
USSR Invites Participation in Nuclear Research	<i>[Rio de Janeiro TV]</i>	18
Ex-CTA Head Urges Emphasis on Space Effort	<i>[FOLHA DE SAO PAULO 4 Jan]</i>	18
IPEN Official Surveys Achievements	<i>[GAZETA MERCANTIL 30 Dec]</i>	19
Collor Addresses Soviet Academy of Sciences	<i>[O ESTADO DE SAO PAULO 2 Feb]</i>	20
CTA Successfully Tests SLV Rocket Motor	<i>[GAZETA MERCANTIL 30 Dec]</i>	21
Sarney Inaugurates Linear Electron Accelerator	<i>[Rio de Janeiro TV]</i>	21

CUBA

Castro Diaz-Balart Stresses Nuclear Achievements	<i>[Havana Radio]</i>	21
--	-----------------------	----

NEAR EAST & SOUTH ASIA

BANGLADESH

South Asia Nuclear Free Zone Proposal Welcomed	<i>[THE NEW NATION 19 Nov]</i>	22
--	--------------------------------	----

INDIA

Development of Domestically Produced ICBM Backed	<i>[PATRIOT 12 Jan]</i>	22
--	-------------------------	----

IRAQ

Iraqi Missile Effort Said Aimed at Israel	<i>[Tel Aviv HA'ARETZ 8 Feb]</i>	22
Government Ready To Launch Satellite	<i>[Paris AFP]</i>	23

ISRAEL

Nuclear Research Center Head Interviewed	<i>[Tel Aviv Radio]</i>	23
--	-------------------------	----

PAKISTAN

Official Leaves for Paris Nuclear Plant Talks	<i>[Islamabad Radio]</i>	25
---	--------------------------	----

SOVIET UNION

Radiation Leak at Kalinin Nuclear Station	<i>[Moscow Radio]</i>	26
'Kirov' Commander Denies Radiation Leak Reports	<i>[KRASNAYA ZVEZDA 31 Jan]</i>	26
'Rumors' of Radiation Leak on 'Kirov' Denied	<i>[TASS]</i>	27
Chernobyl News Conference on Power Station Future	<i>[IZVESTIYA 28 Jan]</i>	27
New Center Set Up for Chernobyl Decontamination	<i>[Moscow Radio]</i>	28

## WEST EUROPE

### CANADA

Darlington Nuclear Plant Gets Approval To Boost Power	[THE TORONTO STAR 29 Dec]	29
Construction of Prototype MAPLE-X Reactor Approved	[THE OTTAWA CITIZEN 5 Jan]	29
WINDSOR STAR Hails Report of U.S. Naval Nuclear Cuts	[THE WINDSOR STAR 19 Dec]	30

### FINLAND

Nuclear Waste Transported to Southern Ural	[Helsinki Radio]	30
--	------------------	----

### SPAIN

Damage at Almaraz II Nuclear Plant Described	[EL INDEPENDIENTE 29 Dec]	31
CSN Criticized for Supporting Vandelllos I Reopening	.....	31
Partiality Charged	[DIARIO 16, 3 Jan]	31
PP Cites Lack of Confidence	[DIARIO 16, 4 Jan]	32
More Rigorous CSN Policy Described	[EL INDEPENDIENTE 5 Jan]	32

### SWEDEN

Nuclear Power Boards Discuss Greifswald Incident	[Stockholm Radio]	33
--	-------------------	----

## SOUTH AFRICA

### Corporation To Close Uranium-Enrichment Plant

*MB2701104090 Johannesburg Domestic Service in English 0500 GMT 27 Jan 90*

[Text] The Atomic Energy Corporation is to discontinue operations at a uranium-enrichment pilot plant at Pelindaba, near Pretoria, which is used mainly for experimentation and research, on the 1st of next month.

A spokesman for the corporation said the uranium-enrichment production plant was not able to meet all the short-term requirements of South Africa's nuclear power program. The corporation said switching off the pilot plant was a logical step taken in the interest of cost effectiveness.

The staff affected by the closure of the pilot plant would be allocated to other programs as far as possible. Several posts, however, would become superfluous, but the affected staff would be treated fairly.

## 1990's Prospects for International, Chinese Nuclear Energy Development

*HK1701032390 Beijing RENMIN RIBAO OVERSEAS EDITION in Chinese 10 Jan 90 p 2*

[Report by Staff Reporter Liu Guochang (0491 0948 2490); "Prospects of Nuclear Power in the 1990's—An Interview with Zheng Yuhui, Responsible Person of China's Institute for Economic Research on Nuclear Industry"]

[Text] History has stridden into the 1990's. What will the prospects for nuclear energy be for China and the world in the last 10 years of the 20th century? For the answer to this question, this reporter paid a special visit to responsible member of China's Institute for Economic Research on Nuclear Industry Comrade Zheng Yuhui.

Comrade Zheng Yuhui, 47, is an expert in post-treatment of nuclear fuel. He was head of Education Department of the Nuclear Industrial Ministry before.

Question: What are the prospects for nuclear energy for the world in the 1990's?

Answer: Two books were published in the United States in 1980. One is "Strategy on Nuclear Resources: Looking forward to the Future of Solar Energy," the other is "The Third Tide." Both books believe nuclear energy is heading for its extinction. The viewpoint had an impact on China. In fact, the world's installed capacity of nuclear energy totaled 310 million kilowatt in 1988, 2.65 times that of 1978, and 2.1 times that of 1980.

In the 1990's, the price of oil as the principal energy resources will go up gradually; of course fluctuations will be inevitable in the process. As fossil fuel is to cause acid rain and hothouse effect [wen shi xiao ying 3306 1358 2400 2019], the demand for nuclear energy will increase. Currently, nuclear energy is the most practical commercialized energy to replace fossil fuel. It is a safe, clean, and economical energy. Therefore, in the 1990's, the number of nuclear power stations will increase rather rapidly across the world. As few orders for nuclear power stations were placed in the past few years, there will be little change in the number of nuclear power stations in early 1990's, but a great number of nuclear power stations will be built toward the end of the 1990's.

At present, two thirds of the installed capacity of the nuclear power stations across the world depend on pressure reactors [ya shui dui 1090 3055 1018]. In the 1990's, the pressure reactor will continue to play a dominant role. But as the pressure reactor can only exploit 1 percent of the energy in uranium as compared with the rapid reactor [kuai dui 1816 1018] which can make use of 90 percent of the same and make low grade uranium worth mining, the rapid reactor will be widely used for generating electricity in the later stage. In France, the 1.2 million kilowatt Ultra-Phoenix [chai feng huang 6389 7685 0420] rapid reactor nuclear power station has been in operation smoothly. France, England, and West Germany are jointly working on a 1.5 million kilowatt European rapid reactor. In the Soviet

Union, the 600,000 kilowatt rapid reactor nuclear power station has been in smooth operation for 9 years, and a number of 800,000 kilowatt rapid reactor nuclear power stations are under construction. At the same time, they are developing a 1.6 million kilowatt rapid reactor nuclear power station. The United States is in the lead in terms of rapid reactor technology. The metal fuel integrated [jin shu ran liao yi ti hua 6855 1466 3595 2436 0001 7555 0553] rapid reactor it developed reduces the multiplication time [bei zeng shi jian 0223 1073 2514 7035] of nuclear fuel by 6 to 7 years. The improvement of rapid reactor technology will make preparations for rapid development of nuclear energy in the next century.

Question: What are the prospects for nuclear energy in China for the 1990's?

Answer: In the 1980's, China decided to incorporate press reactors in the Zhejiang Qinshan Nuclear Power Station and Guangdong Daya Bay Nuclear Power Station. These two power stations are due to be accomplished in early 1990's. Therefore, the 1990's will be the years during which nuclear power stations will emerge in China and will be developed. After the first three pressure reactors totaling 2.1 million kilowatt are accomplished, China will build additional 600,000 kilowatt nuclear power stations incorporating pressure reactors. We shall establish China's standard through, use China-made components and materials in, and have an array of nuclear power stations after building a number of 600,000 kilowatt reactors. After accomplishing the 300,000 kilowatt Qinshan Nuclear Power Station, China will be able to build and export a few pressure reactors after improving the design. At the same time, to meet the much-needed demand for electricity in the coastal regions, we are likely to import a few major press reactor nuclear power stations on the basis of mutual benefits.

In the 1990's China will still make use of nuclear energy by mainly building pressure reactor nuclear power stations. At the same time we must step up research on rapid reactors to make preparations for rapid development of nuclear energy in China in the next century.

Question: How do things stand with China's effort to make use of nuclear energy during the economic improvement and rectification?

Answer: Shortage of funds will cause some difficulties for the development of nuclear energy, putting off some projects. At present, the government is vigorously strengthening raw and semi-finished, transport, energy, and other basic industries by readjusting industrial structure and investment structure so that the national economy will develop in a sustained, stable, and coordinated way. Therefore, from a long-term point of view, the economic improvement and rectification will have a positive and useful influence on the development of nuclear energy in China.

Question: What is the principal job of your institute?

Answer: Our institute was evolved from the former Nuclear Industrial Ministry Development and Research Center in a move to better carry out the policy for

developing nuclear industry: "giving priority to nuclear energy, engaging diverse operations, integrating the resources of the army with those of the people, and invigorating the economy." Our principal job is to do research on strategy for developing nuclear industry, the way to deal with a certain situation, policies, administration; to make strategic decisions; to give forecasts; to work out plans; and so on. Since 1988, we have conducted research on future demand for nuclear energy; the status of nuclear energy in energy resources; the long-term plan for nuclear electricity; self-reliance in building nuclear power stations; the way to raise funds for building nuclear power stations; economic analysis of nuclear electricity; advanced reactors; and other issues concerning the development of nuclear energy. From now on, we shall further strengthen internal and international academic exchange and cooperation, making contributions to the development of China's nuclear energy.

#### Song Ping Visits Nuclear Power Institute

*OW2801185990 Beijing XINHUA Domestic Service  
in Chinese 1431 GMT 24 Jan 90*

[By correspondent Ma Xuquan (7456 2700 3123) and reporter Zhang Baorui (1728 1405 3843)]

[Text] Beijing, 24 Jan (XINHUA)—Song Ping, member of the Standing Committee of the Political Bureau of the CPC Central Committee, visited the Nuclear Power Technical Institute of Qinghua University in Beijing's Changping County this morning. With high spirits, he viewed the accomplishments of this institute's scientific research and expressed his cordial greetings to all faculty members.

Wang Dazhong, director of the institute, briefed Comrade Song Ping on the achievements made by the institute as a result of its keeping to the socialist orientation and supporting the reform and opening to the outside world, as well as the condition of a 5-megawatt low temperature nuclear reactor. This is the first pressure shell-type nuclear reactor with permanent safety features that has been put into operation in the world. It became fully operational on 16 December of last year. It now provides heat for the buildings of the institute.

Song Ping expressed his warm congratulations on the outstanding results achieved by the Nuclear Power Technical Institute of Qinghua University and firmly approved of the faculty members' self-reliance, hard work, and scientific pursuit.

**JAPAN****Japan, U.S. Extend Energy R&D Pact 5 Years**

*OW0202001990 Tokyo KYODO in English 2302 GMT 1 Feb 90*

[Text] Tokyo, Feb. 2 KYODO—Japan and the United States extended for five years Friday an agreement on joint energy research and development, the government announced. The two countries have exchanged notes in Washington on the extension of the accord up to January 1995 and on some additional provisions, including ones about protection of intellectual rights.

The accord, signed in 1979, is aimed at joint studies in six fields, including nuclear fusion and high-energy physics.

**NORTH KOREA****Nuclear Plant Reportedly Under Construction**

*OW0502140190 Tokyo KYODO in English 1340 GMT 5 Feb 90*

[Text] Seoul, Feb. 5 KYODO—North Korea has started building a nuclear power plant in collaboration with the Soviet Union, South Korean sources well informed of Pyongyang affairs said Monday.

The plant, with four nuclear reactors capable of producing 440,000 kilowatts each, is under construction in the northern part of North Korea, the sources said.

The report was the first ever regarding on-going construction of a nuclear power complex by North Korea.

North Korea has only a gas-cooled nuclear reactor that became operational in February 1987 for research use in North Pyongan Province.

North Korea signed an international treaty on nuclear nonproliferation in December 1985, but has not yet allowed inspection of its nuclear power facilities by the International Atomic Energy Agency (IAEA). Pyongyang has not signed an agreement with IAEA.

**Further Reportage on Nuclear Plant****Warning From South Korea**

*SK0902103690 Seoul YONHAP in English 1024 GMT 9 Feb 90*

[Text] Seoul, Feb. 9 (YONHAP)—A South Korean Government official warned North Korea that it will become an "international pariah" if it constructs a nuclear reprocessing plant in defiance of world opinion.

Chon Pung-il, a director with the Science and Technology Ministry and an expert on atomic engineering, was commenting on a Tokyo-based report that North Korea may have a nuclear fuel reprocessing plant near Yongbyon, some 80 km north of Pyongyang.

The information-technology center at Tokai University in Japan Thursday reportedly said it had observed the

nuclear facilities, which appear to be a power station and a reprocessing plant, by computer analysis of infrared photographs taken by the French observation satellite spot last September.

Noting that North Korea has refused to sign the nuclear safeguards agreement with the International Atomic Energy Agency (IAEA), Chon said an IAEA meeting this month in Vienna would urge North Korea again to join the agreement.

North Korea joined the Nuclear Non-Proliferation Treaty in 1985 but delayed signing the fullscope safeguards agreement, arguing that it could not abide by the agreement because there is a nuclear threat against it. Under IAEA regulations, a treaty member should begin negotiations to sign the fullscope safeguard within six months and conclude the negotiations in 18 months. The IAEA cannot investigate North Korea's nuclear facilities to determine whether they are reprocessing plants for military purposes without its consent unless North Korea joins the agreement.

North Korea established an Atomic Energy Institute in Yongbyon in 1962 and imported a research reactor of two-megawatt class from the Soviet Union in 1965, on condition that it would return the radioactive waste. But North Korea constructed for itself in 1987 another reactor of 30-megawatt class that runs on natural uranium. Experts here said North Korea has 200-500 tons of radioactive waste, which is enough to reprocess into sufficient plutonium to make nuclear weapons.

**Pictures of Plant Released**

*SK0902070090 Seoul YONHAP in English 0538 GMT 9 Feb 90*

[Text] Tokyo, Feb. 9 (YONHAP)—North Korea is constructing what appears to be an atomic power plant at Yongbyon near Pyongyang. Toshibumi Sakada, director of the information-technology center of Tokai University, said Thursday.

Sakada said his center had confirmed the construction by computer analysis of infrared photographs taken by the French observation satellite spot at an altitude of 832 kilometers last September.

The photographs clearly show concrete structures that seem to be facilities for nuclear fuel, piles and housing for workers scattered along a big curve of the Kuryong River, which flows through Yongbyon, he said.

Professor Sakada said the structures are apparently facilities for an atomic power station and noted that there were rumors that North Korea had succeeded in building a test pile in the 1970s and a full-scale power plant in the 1980s.

He said that his center decided to release the photographs in order to attract international attention and persuade North Korea to allow an investigation because analysis shows the facilities could be used for military purposes.

It is the first time a private institution has confirmed that North Korea is constructing a nuclear power station.

Radio Moscow recently reported that North Korea was building four nuclear power plants with a generating capacity of 440,000 kilowatts, and a Japanese Foreign Ministry official in November revealed that a atomic fuel treatment plant was being constructed at a site North of Pyongyang.

JANE'S DEFENSE WEEKLY, an authoritative british publication, reported last September that a U.S. reconnaissance satellite had spotted construction at Youngbyun of nuclear test facilities and a high power pile of 50-200 megawatts.

## MONGOLIA

### Radiation Level Reported Normal at Uranium Plant

OW2401094490 Ulaanbaatar International Service  
in English 0910 GMT 23 Jan 90

[Text] Recently the Nuclear Energy Commission of the Mongolian Council of Ministers held a meeting in

Ulaanbaatar. It discussed the report of the working group on establishing the radiation level at the Erdes industry on the territory of Dornod Aymag, East Mongolia. The group was led by Deputy Chairman of the Nuclear Energy Commission, Doctor of Sciences—physics and mathematics—Professor Chultem.

The working group has established that the radiation level is normal at the Erdes plant, its neighborhood, and along the route where uranium ore is transported, and is equivalent to that on the territory of other aymags. Hence the group has ruled out the pollution of the environment by the Erdes plant and the transportation of uranium.

The commission has passed concrete decisions on establishing permanent control on the radiation level at the Erdes plant, a (?steady) approval of rules on uranium ore transportation, training of nuclear experts, and on issuing regular press and media reports on radiation matters.

## CZECHOSLOVAKIA

**Radioactive Leak Admitted; Charges Denied**

AU0702083190

[Editorial Report] Czechoslovak newspapers between 24 and 29 January continue to devote attention to the charges of the Austrian branch of Greenpeace regarding the alleged contamination of the environment with uranium waste from the uranium processing plant at Mydlovary, southern Bohemia, in the early sixties.

Prague MLADA FRONTA in Czech on 24 January on page 7 carries a 450-word Maria Ptackova article entitled "Questions Fired at Mape." In her article, the author first discusses the history and purpose of the Mydlovary plant. She says that the plant, located about 25 km from Ceske Budejovice, was built in the late fifties and early sixties and was given the codename Mape. Its "secret strategic mission was to process uranium ore into a chemical concentrate, which was then sent to the Soviet Union for further use." As Ptackova goes on to say, the production of the concentrate in Mydlovary will be phased out by 1994, in connection with the cutbacks in the Czechoslovak uranium industry, and replaced by an unspecified "alternative production program." In the remaining part of her article, the author interviews managers and Civic Forum representatives of the Mydlovary plant; in their statements they qualify as "distorted and incomplete" the Greenpeace reports about radioactive contamination in the Mydlovary area and assert that "a nuclear accident has never occurred here."

Ptackova's article is followed by a 350-word "jet"-signed undated interview with Jaroslav Ruzicka, who worked as water inspector at the Ministry of Agriculture, Forestry, and Water Economy in the sixties. Ruzicka challenges the Mydlovary managers' statements by noting that a "medium-size accident occurred about 2 years after the start of Mape's operations when technological water spilled over the sludge bed," flowed into the Vltava river and "caused a slight increase of radioactivity upstream from Orlik."

On 25 January, all Czechoslovak newspapers report extensively on a news conference organized by the Ministry of the Environment of the Czech Socialist Republic in Prague on 24 January, which confirmed Ruzicka's version. According to a 900-word MLADA FRONTA report on the news conference, published on pages 1 and 2, the accident referred to by Jaroslav Ruzicka occurred on 1 January 1965 when about 700 cubic meters of waste water leaked from the Mape plant, whose radioactivity amounted to 10 bequerel per liter. Given that the water was escaping for 24 hours and that the minimum flow of the Vltava river is six cubic meters per second, the MLADA FRONTA report points out, it can be expected that the radioactivity was eventually reduced to 0.01 bequerel per liter, which is less than the permitted norm for drinking water. RUDE PRAVO's 800-word report on the news conference, published on page 2, stresses that the leak did not have any negative impact on the health

of the population or on the flora and fauna and that "there is no reason for hysteria." In this connection it takes issue with an article published in the Austrian daily KURIER, which claimed that a radioactivity level of 23,000 bequerel per kilogram of waste water had been ascertained in Mydlovary.

Bratislava PRAVDA in Slovak on 26 January on page 1 publishes a 250-word statement issued by the employees of the Mydlovary plant on 25 January. The statement qualifies as "biased and discrediting" the "campaign that has been unleashed over the ecological harmfulness of the operation of the Mape plant" and states that the Greenpeace documents on which the campaign is based "contain many false facts," such as claims about the subordination of Mape to the Federal Ministry of the Interior, the control of its facilities by the Soviet Army, or the radioactive contamination of the Mydlak lake. The statement refers to the accident of January 1965 as an "operational malfunction" and protests that it "cannot absolutely be compared with the Chernobyl accident as, in our opinion, it has had no negative impact on the state of health of the people." In conclusion of their statement, the Mape employees accuse Greenpeace of being "interested rather in political capital than in ecology itself."

On 29 January, finally, on its pages 1 and 2, RUDE PRAVO carries a 500-word Vladimir Vacha report entitled "The Sensation Did Not Take Place." The article deals with radioactivity measurements conducted at Olesnik near Mydlovary, the site of the Mape plant's sludge pit, on 27 January. As Vacha points out, according to the Greenpeace report "following a catastrophic radioactive accident several years ago, the landscape around Olesnik shows only minimal signs of life." Vacha stresses that independent measurements conducted opposite the community's kindergarten, which is located near one of the sludge pits, and at the edge of the sludge pits themselves showed "values in the range of 0.1 microgray per hour, which is within the norm" and does not exceed natural radioactivity (natural radioactivity is said to be in the range of between 0.09 and 0.15 microgray). Concluding his report, Vacha states that the measurements of 27 January "refuted the unverified Greenpeace slanders about a nuclear catastrophe" and deplores that Greenpeace activists failed to attend the measurements, even though they knew about them.

## GERMAN DEMOCRATIC REPUBLIC

**Safety Official Denies Radioactive Leaks**LD2801164690 East Berlin ADN International Service  
in German 1604 GMT 28 Jan 90

[Excerpt] Berlin (ADN)—No impermissible radiation or release of radioactive material into the environment took place during past "extraordinary events and malfunctions" in GDR nuclear power stations. This was announced by the State Office for Nuclear Safety and Radiation protection to ADN on Sunday [28 January].

In each case measures for preventing a recurrence were taken. The events involved mistakes or operational malfunctioning which were noticed as a result of the monitoring of operational parameters such as pressure, temperature, radioactivity, and others, as well as the regularly carried-out checks of plants and materials or checks as a result of analyzing the malfunctions in other countries' nuclear power stations.

As part of the cooperation in safety checks of the blocks in use at the Greifswald nuclear power station (Rostock Bezirk) agreed during the visit by FRG Environment Minister Toepfer, which have already been introduced, all past events are being reinvestigated. The GDR's competent authorities are in the process of preparing for publication a scientific-technological picture of the safety aspects of relevant events. [passage omitted]

#### Nuclear Power Plant Expansion Problems Noted

90EG0140A Frankfurt/Main FRANKFURTER  
ALLGEMEINE in German 22 Jan 90 p 15

[Article signed "K.B.": "Holdups in Expanding Nuclear Power in the GDR"]

[Text] Stendal/Greifswald, 21 Jan 90—The West has long been aware of ambitious plans to exploit nuclear energy in the GDR. However, during their visit to the nuclear power plant sites in Greifswald and Stendal, FRG Minister for Environment Klaus Toepfer and his staff were surprised at how far new construction has progressed. The dimensions of the construction site in Stendal are also much greater than had been imagined. In the past, there were repeated announcements to the effect that the expansion program was experiencing significant delays. However, at the giant construction site in Stendal, 50 km from the border, the dome will soon be placed on the first block of four planned reactors. A huge crane from Mannesmann-Demag is already in place for the job; its brilliant yellow color is in contrast to the grayness of the construction site.

The site of the plant, on former farmland on the Elbe River, is so extensive that one has the impression that it is as big as that of BASF in Ludwigshafen. The plant and construction management believes that they now have a reliable calculation for the first two reactors. Including all secondary facilities, the pipeline system, and road construction, an investment level of 17.4 billion GDR marks has been reached. It is not yet possible to estimate the cost of the other two reactors.

The first nuclear power plant should go into operation in 1994. The ninth party congress of the SED [Socialist Unity Party of Germany] had resolved that it should be ready in 1991. Construction has been under way since 1982. The reactors are the Soviet WWER type, with an output of 1,000 megawatts. The abbreviation "WWER" stands for water-water energy reactor, a pressurized water reactor. After the shock of Chernobyl, the designers and enterprises in the USSR made an effort to increase the level of safety. It is said on the construction

site that the first reactor alone has been improved by 68 safety measures. A great deal of time has passed since the individual improvements were adopted. Since there are problems with the material in the first Greifswald reactors, steel is being purchased from the FRG and Belgium at tangibly higher prices.

The crew at work on the Stendal construction site consists of more than 10,000 workers. Work proceeds around the clock. One shift lasts 12 hours. After eight days, each shift crew gets that same period of time off. Almost as many people are at work on three other reactors near the Baltic Sea resort of Lubmin, on Greifswald Lake. No Soviet designers and power plant builders were to be seen during Toepfer's visit.

The GDR nuclear power plant program dates back to a 1955 government agreement with the USSR. Its name is "Agreement on Assistance by the USSR to the GDR in the Area of Nuclear Physics and of Utilization of Atomic Energy for the Needs of the National Economy." Even experts in the GDR only recently learned details about the inside of the reactors, which the Soviet nuclear energy industry erected and will continue to build. It was not possible to develop a separate GDR nuclear technology, says director-general Reiner Lehmann of the "Bruno Leuschner" Nuclear Power Plants Combine, which operates all the nuclear power plants in the GDR, including a storage site for low- and medium-active waste in the former salt pit at Morsleben, across the border from Helmstedt. For the sake of safety, he says, the GDR is now entering into expanded cooperation, especially with the FRG, which in an international comparison ensures the highest standards in nuclear technology.

The GDR nuclear power program was begun in 1966 with the operation of a reactor in Rheinsberg with an output of only 70 megawatts. It is used primarily for training. The prudence and skill of the personnel must make up for shortcomings in technical safety in the nuclear power plants in operation. Construction began in the Lubmin moor in 1967. There, a series of reactors with an output of 440 megawatts was developed. From 1973 to 1979, four power plants were developed. A fifth one was started up last year but was soon shut down again, reportedly due to safety flaws. Construction of the sixth reactor is at an advanced stage. Work has already begun on a seventh and eighth reactor.

With the first four blocks, which were fully extended during Toepfer's visit, the Nuclear Power Plants Combine produces 10 percent of the electricity used by the GDR, with nearly 8,000 employees. In addition, 15,000 dwellings, 45 industrial enterprises, 15 schools, public facilities, and a greenhouse are supplied with district heating. District heating is planned for Stendal as well.

After storage directly at the reactor in Greifswald, the used-up fuel elements go to an intermediate storage facility. There, the radioactivity in the fuel elements is supposed to decay for at least 5 years. According to the

nuclear power plant combine, no thought is given to the further treatment of this highly radioactive waste. Nor do the operators of the power plant and the Office for Atomic Safety and Radiation Protection have to think about this, since Moscow has guaranteed East Berlin in a treaty that the burned-out nuclear fuel rods will be taken away by the USSR. This has happened in the past. At the moment, however, word has it that no fuel elements are being handed over. There are apparently several reasons that the USSR is delaying its acceptance of the elements. It is insisting on the cool-off time of five years in Greifswald. As far as can be ascertained, there is no processing of the fuel elements in the USSR. They have to be stored there as well. The intermediate storage facility in Greifswald is adequate for a long period of time, and according to information from FRG experts it is in good shape. The hesitation in accepting the fuel elements could also have to do with Soviet authorities wanting to negotiate for a price more favorable to them.

Major holdups are emerging in the further expansion of nuclear power in the GDR. The technology must be improved. If inspection of the power plants within the framework of German-German cooperation should reveal that it is not possible to adequately refit the systems and that it makes no sense economically, shutdowns will be inevitable. There are reasons to assume that the even greater bottlenecks in the GDR energy supply that would result from this could be eliminated through a partnership with FRG companies. Rumor has it that reactors from the Konvoi series by Siemens Kraftwerk Union are to be operated in the GDR as a joint venture between the PreussenElektra and Bayernwerk power companies. Plant chief Lehmann's reaction: "This information from the FRG is utterly unsound."

## Government Discusses 1975 Nuclear Accident

### Details of Accident Noted

AU2201185190 Hamburg DER SPIEGEL in German  
22 Jan 90 pp 85-87

[Unattributed report: "Everything Dead"]

[Excerpt] [Passage omitted] For decades the SED [Socialist Unity Party of Germany] regime had concealed the dangers of nuclear power plants from its citizens, and incidents have been covered up. Experts in the GDR are now visibly relieved that they can publicly talk about safety problems and—maybe—solve them, with Bonn's help. Numerous construction defects have been detected, GDR experts admit. "In the course of my visit, my reservations were not eliminated, but my doubts increased," FRG Environment Minister Toepfer stated.

This is a cautiously worded statement. The Bonn minister and his expert on reactor safety, Adolf Birkhofer, want to avoid giving the impression that the joint safety analysis of the four pressurized water reactors of the "Bruno Leuschner" combine near Greifswald, which

were put into operation between 1973 and 1980, is only a formal matter, while the outcome is already considered to be certain.

However, the disaster is quite obvious. Georg Sitzlack, the GDR official responsible for radiation safety, confirms the doubts.

After all, old plants are involved that "were created by Soviet heads 30 years ago." It is not certain "whether we are still capable of acting in certain borderline cases."

In one instance, it was mere coincidence that a disaster was prevented, and so far the GDR Government has not admitted that a catastrophe of the dimensions of the nuclear accident in Chernobyl in the Ukraine nearly took place. It was "a wonder" that "large parts of northern Germany, Denmark, and Sweden" were not contaminated by radioactivity, an engineer responsible for the safety of the plant stressed.

Because of inadmissible work on the earthing system by an electrical engineer who was instructing a new colleague, a cable system in the WWER-440 nuclear power plant supplied by the Soviet Union was set on fire. The electrical engineer released the safety device of a lever locking the earthing system of the 6-kilovolt plant: "The man's pliers slipped, and this was the beginning of the disaster."

Safety devices that had been checked several times failed completely. The emergency power-generating plant driven by diesel generators, which is supposed to supply the most important units of a nuclear power plant with electricity, such as the pumps for a stand-by cooling system, failed. "The cables in the emergency power-generating plant also burned." Only the emergency shutdown, the "protection against damage of the first order" worked. The absorber cassettes [Absorberkassetten] fell between the fuel elements and interrupted the chain reaction. However, the remaining heat of about 80 megawatts continued to pose an extreme danger. There was the danger of a nuclear meltdown.

"The time bomb was ticking," the engineer stated. The catastrophe could only be avoided if it were possible to channel off the enormous energy through cooling water.

All six pumps designed to channel off the heat in normal operations were out of order because of the fire. The stand-by cooling system included six more pumps, five of which could not be activated.

"By a mere coincidence" because of maintenance work, the sixth stand-by pump was not connected with the power-generating plant of the burning block I, but with reactor block II.

In the control room, all important indicating devices had failed, "everything was dead." Nobody was able to exactly analyze the situation in the reactor, the engineer reported. While the fire brigade was fighting the fire, as a result of which heavy smoke and gas had developed,

they wondered whether a meltdown would take place or not. The pump was strong enough to prevent this.

The places where fire had broken out were cleaned under strict secrecy, with the Army being used as well. Block I was repaired at a speed that is unusual for GDR conditions, and put into operation again after about 4 months. [passage omitted]

### Statement Released

LD2201164190 East Berlin ADN International Service  
in German 1558 GMT 22 Jan 90

[Text] Berlin (ADN)—During the accident in the Greifswald nuclear power station (GDR Area of Rostock) in December 1975 there was no damage to fuel elements and no impermissible effects from radiation. This was announced by the GDR State Office of Nuclear Security and Radiation Protection in a statement sent to ADN. The statement was occasioned by an article in the FRG magazine, SPIEGEL, which raises the subject of the operational safety of the nuclear power station in its latest edition and reports on the accident, however, dating it as 1976.

Apparently SPIEGEL was referring to the accident in December 1975 in which control and power cables in blocks 1 and 2 became nonoperational. The reactors were shut down automatically and measures for the disposal of excess heat were carried out, the statement says. As a result of investigations, measures to increase safety were instituted.

"Within the framework of bilateral cooperation with the FRG, the incident will be included in the planned joint safety assessment of the blocks 1 to 4 of the Greifswald nuclear power station."

### Report Issued

LD2501232490 East Berlin ADN International Service  
in German 1932 GMT 25 Jan 90

[Text] Berlin (ADN)—The State Office for Nuclear Safety and Radiation Protection has sent a report to ADN on the breakdown at the Greifswald Nuclear Power Station in the GDR during which Block I had to be shut down in 1975.

According to this, there was a short circuit in a 6-kilovolt switching device. The cause was a circuiting mistake by an electrician. Through the failure of the automatic cut-out, a strong short-circuit current flowed for several minutes. A large number of electric cables were destroyed in the fire caused by this. No one was injured.

It is stressed in the summary of the report that at all times during the breakdown nuclear fission was safely stopped, and that the cooling of the area of fission was guaranteed at all times. There had been no damage to the nuclear fuel, the reactor or the primary cycle. "The release of radioactivity into the surrounding area was

raised by the temporary opening of the safety valves on the pressure retainer, but remained below permitted limits.

It is also stated that the cooling systems were restricted in their functions. The emergency cooling pumps had worked to the necessary extent and the emergency feed pumps of the secondary cycle after the creation of a provisional arrangement. The operating personnel had behaved logically and calmly at all times.

After the investigation by independent experts and the state supervisory authorities, fire-prevention measures were carried out on the electrical supply grids. The safety valves were exchanged "for types of greater reliability from West Germany." As an internal emergency protection measure, a link in the emergency provision of feed water was created to the neighboring block.

### Ecology, Nuclear Safety Discussed at Roundtable

LD2901120490 East Berlin ADN International Service  
in German 1035 GMT 29 Jan 90

[Excerpts] Berlin (ADN)—The representatives of the parties and groupings present at the roundtable in Berlin on Monday discussed issues of the ecology in the GDR as the first item on the agenda.

Environment Minister Dr Peter Diederich said that in order to reduce the environmental pollution in the GDR a fundamentally changed ecology policy was needed. His ministry would be a virtual environment authority. [passage omitted]

A different structural and energy policy is needed. The primary means for a future ecology-friendly industry consists in turning away from raw materials and energy-intensive products to higher processed products in a radically changed structure of the national economy and foreign trade. [passage omitted]

Higher payments and investments for environmental protection projects, particularly for the Leipzig and Dresden regions, are earmarked in the plan for 1990.

The construction of new nuclear power stations may not be expected in the foreseeable future. Prof Dr Karl-Hermann Steinberg, deputy minister of heavy industry, said in reply to questions from roundtable representatives. The 70 megawatt reactor in Rheinsberg is to be decommissioned in 1992. The final construction stage of the Nord nuclear power station, with a total of eight blocks of 440 megawatts each, will be continued gradually, according to the minister. The blocks still to be commissioned will be equipped to Western safety standards. In Stendal, four blocks of 1000 megawatts each are to be commissioned gradually. [passage omitted]

**POLAND****Nuclear Power Plant Construction Reviewed at Sejm Session**

LD2701055190 Warsaw PAP in English 2150 GMT  
26 Jan 90

[Excerpt] [Passage omitted]

**Problem of Nuclear Power Plant**

Chairman of the State Atomic Agency Professor Roman Zelazny presented to the Sejm the government's point of view on the construction of a nuclear power plant in Zarnowiec (coastal Poland).

Zelazny appealed to the deputies for wisdom, confidence and lack of emotions while considering the problem. He stressed that the Sejm's negative decision on Zarnowiec passed now would be received as a vote of no confidence for the government.

He told the deputies about the intention to appoint a team of experts to supervise the construction. They would inform society about their opinions.

Even advocates of the nuclear power plant concede that one cannot construct it without social consent and there is no social consent for Zarnowiec, stated Deputy Antoni Furtak (OKP). To the protest petitions containing 120 thousand signatures which he presented to the government a week ago, the deputy added more lists with 20 thousand signatures. They go to show that society is against nuclear power, he stressed.

Deputy Tadeusz Bilinski (PUWP) moved that a decision on the continuation of the construction be left to the government. In his view only the government can use the opinions of experts and make decisions taking account of economic and social needs.

If the decision is to belong to the Sejm, as even the Kerm [as received] Government Economic Committee was not able to make it, the government should once again present a precise and honest analysis not only of the country's power balance but also of ecologic threats, the power-intensity of industry, investment undertakings to limit the emission of harmful gases and dust from power plants already operating, stressed Joanna Proszowska who wrapped up the discussions.

"I admire those who already hold firm opinions on the construction of the power plant in Zarnowiec," stated Industry Minister Tadeusz Syryjczyk referring to the deputies' discussion. Presenting the government's stance on the matter, he recalled that he decided to halt the construction of the power plant in Zarnowiec for 1990. The final stance will be adopted following indepth analysis and following the elaboration of a program of developing the power industry, nuclear inclusive.

Society will be informed about all moves, the minister stressed, recalling that the Sejm is empowered to make a decision regarding the fate of the power plant in Zarnowiec as well as calling a referendum on the matter.

The Sejm however made no such decisions because it turned out that there were only 144 deputies in the hall, below the quorum. "This period of time will allow us to learn the opinions of objective people, without unnecessary emotions and unrest," Deputy Speaker Fiszbach summed up the debate.

Question period followed next.

## ARGENTINA

### Flaws in Nuclear Policy Outlined

90WP0031A Buenos Aires LA PRENSA in Spanish  
5 Jan 90 p 6

[Article by Miguel J. Culaciati: "Nuclear Policy Errors"]

[Text] There are all too many issues on which emotions or inflexible ideological principles seem to prevent a reasoned consideration of the nation's interests.

Nuclear policy is one of them. And not just in Argentina but in almost all of the countries in the world that have made headway in developing the technology of the atom, both those that possess weapons of terrifying destructive power and those that maintain that they will never build them.

Even in the Soviet Union after Chernobyl the country's nuclear program has prompted criticism as bold as it is well founded.

The same thing has happened in the United States, as the construction of new nuclear power plants has been halted, and this also goes for Sweden, Switzerland, etc.

Little by little and for various reasons the people of the world have gotten a clear idea of the risks that are involved in living with nuclear weapons or nuclear facilities for peaceful purposes, such as electric-power plants.

Several international treaties have been drafted to prevent the proliferation of atomic weapons, especially among nations that could use them only in local conflicts. The most important of them is the so-called TNP (Nuclear Nonproliferation Treaty).

There are others that encompass a specific region of the planet, such as the Tlatelolco Treaty, which seeks to prevent the installation, development, transportation, or use of atomic weapons in Latin America. There are also agreements among the countries in the so-called atomic club, which already have nuclear arsenals and are trying to prevent other countries from amassing them.

These nations have defended their stand by arguing that the more governments possess atomic weapons, the more danger there is of a widespread war that will shatter the precarious balance under which we live and destroy civilization. To this end they have imposed on the countries that want to make headway in nuclear development certain requirements called "safeguards." Under them, before a country can sell or transfer technology, lend aid, arrange for studies, or contribute in any way to a nuclear project, the country requiring assistance must allow international inspectors of acknowledged technical competence to verify that the equipment that it is receiving or developing under license will be used solely for peaceful purposes.

Nothing, in fact, could be more logical, but nothing could be more complicated politically.

All of the European countries that do not have nuclear arsenals have agreed to this policy and have even set up a research, monitoring, and development agency called Euratom.

The problem in Europe is no longer the development of a country's own nuclear weapons but rather the installation of NATO missiles, which makes these countries potential targets of a nuclear attack, and the possibility of serious contamination from accidents at nuclear power plants and from the manufacture of nuclear fuel (reprocessing).

In the rest of the world only Canada has achieved major development while accepting international safeguards.

The fact that our country and others in South America have not signed the Tlatelolco Treaty could put us in an unpleasant dilemma at any moment. Argentine authorities have not duly clarified this and have instead put out a news smoke screen shot through with idealism and politics.

The time has come for common sense and realism.

Why then not address the nuclear issue the same way?

We know that we cannot compete with the developed countries that are masters of the technology and possess much greater financial wherewithal.

This is proven by the fact that the CNEA [National Atomic Energy Commission] has had to resort to German, Canadian, or American technology and agree to comprehensive safeguards to build many major projects.

There remains valuable research and experimentation, but this has turned out to be slower and more expensive because it has had to be conducted to the annoyance of those who could help us and are much more advanced precisely because they have spent huge sums for this purpose.

A decade ago, those who advocated cooperation with Brazil, such as the author of this article, were suspected of serving shady foreign interests.

Today, thank God, that seems to be over. Nevertheless, the battle is still being fought to break down the barriers of self-defense erected by the bureaucracy, the national holding companies that have managed to create artificial conditions which make them the only possible winners of any nuclear public bidding, and the company that supplies technology, fearful that it might lose juicy, carefully drafted contracts.

For their own good they should all realize that the country cannot continue in isolation in this field with a statist, monopolistic, and ultranationalistic policy that works against all other national progress, all the more so

because, as we shall soon see, the CNEA will require huge infusions of capital that the government cannot provide.

The nuclear area must be privatized, deregulated, and demonopolized; the construction and running of nuclear power plants must be removed from the state-run system, and the bulk of the work in planning, completing, and repairing these power plants must be turned over to a private firm with international capabilities, reserving for the CNEA its role as a careful monitor of security in all respects.

It also seems essential for the CNEA to cease operating like a bureaucratic fiefdom that deals only with the nation's president and to start functioning like any other state-run enterprise. This squares perfectly with the pacifist principles that it has repeatedly proclaimed and ensures that the country will conduct its much-needed nuclear research in an open and safe manner.

Congress must become involved in the issue, set up special study commissions, and pass a body of laws regulating nuclear activity.

The first and most important of these laws must concern nuclear safety.

It will spell out the role of the monitoring authority and establish strict standards to prevent nuclear facilities from being located in the future at sites that are potentially dangerous because of their proximity to large population centers, rivers, easily contaminated farming areas, borders, earthquake-prone areas, etc. This is fundamental and, regrettably, has not been taken into account until now, thus creating a dangerous framework.

Indeed, both Atucha I and Atucha II, and the pools in which the radioactive waste is stored are located just 150 km from Buenos Aires, Rosario, San Nicolas, San Pedro, etc., and right on the Parana River, from which the big city gets its water downstream in the country's nerve center; they are also close to Argentina's rich farming region.

The other power plant, Embalse, is located in an area 80 km from the city of Cordoba, Rio Cuarto, Rio Tercero, etc., in the midst of a tourist area, by a lake whose waters it uses and whose average temperature it has increased by two or three degrees.

At a cost of about \$300 million the CNEA has just built a nuclear-fuel "reprocessing" center, that is, a plutonium plant, right in Greater Buenos Aires, in the Esteban Echeverria district, to the great alarm of residents.

Consequently, a widely debated national law is clearly needed to deal with the future of these and other nuclear facilities that could cause serious problems. The role of the CNEA must also be determined.

Will it continue to be a bureaucratic monster in charge of the country's atomic monopoly, building and running power plants, creating the infrastructure needed to fuel

them, getting involved like a manager in everything, exporting reactors and other equipment, etc., or will it become a research, development, and safety-monitoring agency?

The second alternative is, to be sure, the only viable one, not only because the country cannot continue to waste huge sums of money on the nuclear plan but above all because that is the trend today, as research, development, and safety monitoring are the only areas in which government ought to be involved, with only safety monitoring a monopoly.

Deep down, nuclear policy is predicated on two questions. One: Is the country genuinely dedicated to peace, or are its arguments merely a cover for its ultimate desire to build atomic bombs should the need arise?

And two: Does it seek to establish a statist, nationalist, monopolistic, and closed system, or will government allow private nationals or foreigners to build nuclear facilities and reserve for itself the role of rigorously monitoring security?

In the first case, the country will continue to resist signing the nuclear nonproliferation treaties and will seek the sort of nuclear development that will enable it to have unfettered access to sensitive equipment that can be used to make atomic weapons.

Moreover, since this is possible only amid secrecy, the entire system will be rigorously controlled by the State.

The other option truly rules out the military use of the atom, therefore accepts the international treaties and inspections, because there is nothing to hide, and frees the forces of the marketplace to take advantage of more economical and proven technologies. And all of this does not mean that the State will not continue to monitor safety; at the same time it will allocate budgetary funds for research and development without allowing sensitive technology to be transferred irresponsibly to countries that the world community has isolated (Libya, Algeria) or that are convulsed by serious turmoil (Peru).

We will soon know which policy our country will pursue.

#### **CNEA Bemoans Loss of Autonomy, Cites Risks**

90WP0031B Buenos Aires CLARIN in Spanish  
6 Jan 90 2 8

[Article by Eleonora Gosman: "The CNEA, a Question Mark"]

[Text] The administration's decision to transfer the National Atomic Energy Commission (CNEA) to the sphere of the Energy Secretariat, which it did via Decree 1573 on 27 December, sent shock waves through the nuclear sector, jolting not only the agency's scientists and technicians but also the business circles involved in the field.

CNEA personnel, including mid-level executives and a segment of upper-level management, do not care for their new dependency, and not just because the agency has lost the stature of having its own budget and answering directly to the nation's president.

There is good reason why the technicians and professionals are annoyed. It so happens that the transfer creates more problems than it solves, and we are not questioning here the good intentions that the administration may have had. First of all, the commission argues that the transfer will not help to resolve the problems that have been plaguing the nuclear industry in recent years. A clear-cut nuclear policy is still lacking, partly because of the erratic performance of successive CNEA management teams.

What most worries them, however, is that the internal disarray and the worsening state of research and development that have beset the CNEA in the 1980's will, far from being corrected, turn into an explosive issue. They spoke frankly about the matter yesterday: "We will not be able to guarantee the operation of those sectors not directly linked to energy production," they warned, concluding that we are running the risk "of a dismemberment, with the resulting disappearance of some sectors and damage to others."

We can draw other immediate conclusions from the official decision. The CNEA will cease to have its own budgetary funding, and thus its needs will have to be met with the funds that the Energy Secretariat is given. In practice this means a drastic curtailment of the autonomy that the agency used to enjoy. Henceforth, its authorities will have to set spending priorities in conjunction with the secretary of the area, Julio Cesar Araoz.

It is true that several of the agency's management teams made the mistake of holding back relevant information about how they were using the funds they were getting. This was the main argument that the national cabinet cited to justify the transfer. That, at least, was what the legal and technical secretary of the presidency, Raul Granillo Ocampo, suggested to the labor leaders and representatives of the commission's trade-union professionals who met with him early this week. But under the approach that was taken to resolve the issue, this complex agency will not be run efficiently unless it retains its independence.

To dispel fears, Secretary Araoz hastened to indicate this week that the CNEA's change of jurisdiction does not imply that it will lose autonomy, and he promised that "there will be no bureaucratic obstacles of any kind" to the performance of its tasks. He also underscored that "the professionals and technicians on the commission know me and know that my commitment to their cause is unshakable." The staff also contend that "everyone knows that in today's world those nations that possess and maintain mastery of state-of-the-art technologies, one of which is obviously nuclear power, will be able to

develop." There is no disagreement on this, but the fact is that in the CNEA they are predicting the opposite: "There is a danger that the efforts of 39 years will be undone"; moreover, there is a growing "danger of declining safety standards at major installations, from nuclear power plants on down."

#### President of CNEA Outlines Goals for 1990

PY2901233090 Buenos Aires Domestic Service  
in Spanish 1500 GMT 29 Jan 90

[Text] National Atomic Energy Commission [CNEA] President Manuel Mondino, who today met with President Carlos Menem, has said that for the time being there will be no power shortage.

Mondino said after the audience that he had briefed Menem on the results of CNEA activities since July 1989. Mondino said that the priority targets for 1990 are the work at Atucha II, which is slowly moving forward—only 60 percent of the work has been completed—the continuation of the uranium enrichment plant, and the completion of the heavy-water plant in 1991.

As for the situation of the power-generation network and possible emergencies, Mondino said:

[Begin Mondino recording] I would say that there will be no such emergency right now. There is enough water. We had a minor problem at the Embalse plant and we decided to discontinue operations last night to check our fuel-monitoring system. Embalse will resume operations in 40 or 50 hours. We are doing this because of the current water reserve. [end recording]

Regarding the CNEA budget, Mondino, who said that the power emergency cabinet meets every Monday, noted that there are some debts owed to foreign suppliers it would be advantageous to repay so the CNEA could perform independently in the nuclear sector.

He also submitted a draft project to the president, taking into account the CNEA deficit.

#### BRAZIL

##### Santo Amaro Plant Emits Excessive Radiation

90WP00274 Sao Paulo O ESTADO DE SAO PAULO  
in Portuguese 10 Jan 90 p 13

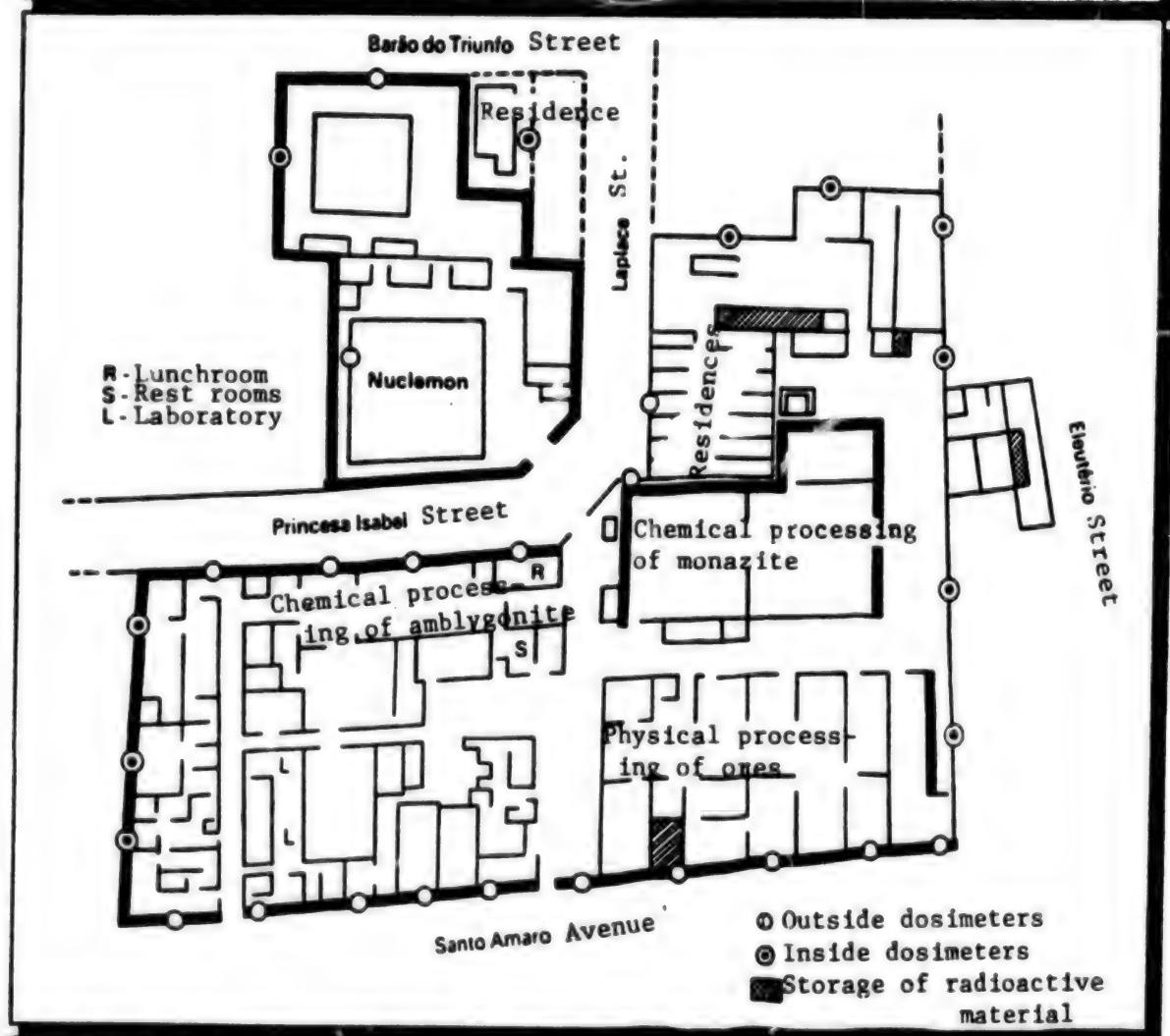
[Article by Tania Malheiros]

[Text] Rio de Janeiro—The Santo Amaro Monazite Sand Processing Plant (Usam), located in the vicinity of Joaquim Nabuco Street in Sao Paulo, is experiencing problems with radiation leaks (exposure) far above the permissible levels set by the National Nuclear Energy Commission (CNEN) and the International Atomic Energy Agency (IAEA) and may have caused health problems for anyone who passed close by. Concerned by the possibility that residents have been contaminated, experts from the Institute of Radio-Protection and

## Radiation Map

**O mapa da radiação**

A planta da Nuclemon, em Santo Amaro, com os locais de estocagem de material radioativo e os pontos de dosimetria (o registro de emissão de radiação) do Instituto de Radiometria e Dosimetria do CNEN que registraram a faixa de exposição gamma. Os pontos mais críticos estão na Rua Eleuterio e na Av. Santo Amaro.



The Nuclemon plant in Santo Amaro, showing the storage areas for radioactive material and the dosimetry stations (for recording radiation emissions) set up by the CNEN's Institute of Radio-Protection and Dosimetry to measure the range of gamma radiation. The most critical locations are on Eleuterio Street and Santo Amaro Avenue.

Dosimetry (IRD) have prepared a series of recommendations that the plant be closed or moved to another location.

The problem is revealed in the Environmental Control Report prepared by Nuclemon [Nuclebras Monazite and Associated Elements, Ltd.], which is the company responsible for the plant. The Estado Agency has gained exclusive access to that report. Although the report notes the existence of problems with radiation exposure from 1986 to 1988, experts claim that they have existed for many years (the plant was set up in 1942) and that the

situation is still the same today. Because of that, studies are under way to move the plant to another Nuclemon facility in Interlagos where rare earths (an element that also includes monazite) are processed for export to Japan. Usam is part of Nuclemon Minerochemicals, Ltd., a branch of Brazil Nuclear Industries (INB), which is an agency of the CNEN.

According to the CNEN's standards, the maximum permissible limit of radiation exposure for individuals not working in the plant is 100 millirems (a measure of

external radiation exposure) per year, or approximately 12 microrems per hour. A microrem is one-thousandth of a millirem.

At measurement station No 08/12/022, for example, which is located outside, the report states that from August 1986 to March 1987, exposure reached 74.3 microrems per hour, or six times more than the tolerable level. According to the document, that station is located "next to the wall" in a spot where radioactive products were stored, "resulting in an exposure rate higher than the established limit." The report states that after areas for the storage of radioactive material were marked off, the material was moved to a point approximately 5 meters from the wall.

Nuclemon's Environmental Control Report says that at one internal location used for storing radioactive material, the exposure level measured 276.2 microrems per hour for 8 months (from 4 September 1987 to 5 May 1988).

To give an idea of the problem, it is stated that at that same location, radiation increased gradually between 1986 and 1987. For 7 months—from 19 August 1986 to 6 March 1987—the level of radiation exposure was 195.6 microrems per hour. Over the next 6 months—from 6 March 1987 to 4 September 1987—exposure rose to 258.9 microrems per hour.

In the section of the Environmental Control Report dealing with analysis of "exposure rates," it is stated that 30 locations were tested with dosimeters. Another location also "showed an exposure rate above the established limit during the first period of monitoring, which lasted from 19 August 1986 to 6 March 1987, because of sporadic temporary storage"—of sacks containing fractions of chemicals resulting from the purification of monazite.

The Estado Agency has also learned that the dosimeters (small instruments for detecting the external radiation level) were not installed correctly inside and outside the Usam building. According to experts in the nuclear industry, those instruments should be placed 1 meter off the ground, not 3 meters, as is actually the case. According to the experts, the dosimeters might detect even higher levels of radiation exposure at a height of 1 meter.

#### Firm in Operation Since 1942

Rio de Janeiro—Located on 20,000 square meters in the Brooklin Paulista neighborhood, the Santo Amaro plant (Usam) currently has about 430 employees, including workers, technicians, and administrative staff. The unit has worked with monazite sands (composed of uranium, thorium, and rare earths) since it was established in 1942, when it belonged to Orquima, Inc. At the end of World War II, Orquima's property was expropriated, and the plant passed under the control of the Federal Government. Currently, Usam is directly controlled by Nuclemon Minerochemicals, Ltd.

Usam stores uranium and thorium (both radioactive elements) which are later shipped to a Brazil Nuclear Industries (INB) plant in the municipality of Pocos de Caldas in the State of Minas Gerais. The INB's management has announced that uranium and thorium cannot be exported because they are considered scarce strategic products. Uranium is used as a fuel in nuclear reactors and in the manufacturing of atom bombs.

In the 1950's, the Brazilian Government was accused by a congressional committee of exporting monazite sands to the United States in exchange for wheat. Known as the "wheat agreement," that case led to the appointment of an investigating commission but was never completely cleared up. At the time of the agreement, the United States wanted monazite sands for the extraction of uranium to be used to produce nuclear weapons. Also extracted from monazite sands are products such as trisodium phosphate, which is used in the manufacture of detergents, paint removers, and degreasing agents and in the treatment of natural and synthetic textile fibers, among other things.

In 1988, Nuclemon exported 839.2 metric tons of rare-earth chloride to Japan. At the time, the company did not have a unit capable of separating the 16 elements making up the product. That unit has now been built in the Interlagos neighborhood and has been using Japanese technology for 3 months.

#### Neighbors Ignore Danger

The residents living near Usam appear to be more concerned about the effects of the pollution emitted by the plant than about the possible harm due to radiation. The explanation seems simple. "We have no way of measuring the effects of radiation, although we have heard that it is a threat," said Demosthenes Cenamo, a 62-year-old Portuguese teacher who lives on Barao do Triunfo Street near Usam. "But I have noticed that the cars around here are covered with black dust every morning."

Housewife Ida Tomoni, who has lived on Barao do Triunfo Street for 30 years, says that clothes hung on the clothesline get dirty from the black dust emitted by the plant. But she has no idea what Usam does. She says: "The only thing I can say is that trucks come out of there all day long." According to her, there used to be a strong smell of sulfur at the place, but that problem now seems to have been solved.

Five families of Usam employees live on Laplace Street, which runs alongside the plant. One employee who did not want to be identified said he had lived there for 7 years and "if there was any danger, I wouldn't have brought my children here." He says that all employees at the plant wear dosimeters—instruments that measure

radiation levels in the environment—on their clothing. According to him, those dosimeters are checked once a month.

American scientist Kenneth Collins, a radiation expert who teaches in the Chemistry Department at Unicamp [Campinas State University], feels that an emission rate of 26.2 microrems per hour is "high enough." He says: "The authorities should look into the matter." But according to him, there are stretches of beach in Espirito Santo where the sand emits about 10,000 microrems per year. The result, he says, is that people who stay on those beaches are subjected to more radiation than the people living next to the plant in Sao Paulo. In his opinion, the situation becomes a matter for concern when exposure reaches 1,000 millirems per year. Resident Demosthenes Cenamo claims that none of the residents has ever been contacted by Usam. "I have heard that the plant is about to move away from here," he commented. "That is something all the residents would like to see."

#### **IPEN Says Santo Amaro Radiation Level Low**

90WP0029A Sao Paulo *O ESTADO DE SAO PAULO*  
*in Portuguese* 12 Jan 90 p 12

[Text] Experts from the Institute for Nuclear and Energy Research (IPEN) determined yesterday that radiation levels outside the Santo Amaro Plant (Usam) are well below the limits established by international standards and by the National Nuclear Energy Commission (CNEN). Measurements were taken at 19 points along Santo Amaro and Princesa Isabel Streets that were chosen on the basis of the firm's activity. The highest level detected was 60 microrems, or three times less than the allowable tolerance level for pedestrians, which is set at 192 microrems over a 1.5-hour period per day. Measurements at the other points ranged from 20 to 40 microrems.

"There is no danger for people on the outside, since the values recorded were far below the established standards, taking into account the appropriate exposure factor," says physicist Laercio Antonio Vinhas, director of nuclear safety at the IPEN. He says that the level of 12 microrems, which according to international standards is the amount a person can be exposed to in 1 hour, is a restrictive value. "That value applies only to someone who remains inside the plant for 24 hours a day, 365 days a year," he says.

International standards set a limit of 192 microrems per hour for individuals if they are exposed to radiation 7 days a week. "I believe that the values reported by the CNEN were interpreted incorrectly. Those values are correct, but they need to be analyzed in terms of the basic guidelines for radiation protection," says the physicist.

The measurement was requested by the CNEN itself and by Nuclemon [Nuclebras Monazite and Associated Elements, Ltd.] Minerochemicals, Ltd., which operates the plant. The health office of the State Consumer Police

Department (Decon) will receive the technical reports and use them to determine whether there is a danger to the population. Police Chief Eugenio Figueredo visited the plant yesterday and took photographs of the machinery in case an investigation is started. "We will wait for the IPEN's reports. If it is confirmed that the levels are harmful to the population, we will start an investigation of Usam," the police chief said.

#### **Angra I Resumes Operations**

90WP0027B Sao Paulo *O ESTADO DE SAO PAULO*  
*in Portuguese* 5 Jan 90 p 10

[Text] Rio de Janeiro—Angra I, the nuclear power plant in Angra dos Reis, will be restarted within the next few days despite protests by ecologists. The day before yesterday, the presiding judge of the Federal Regional Court in Rio de Janeiro, Judge Paulo Freitas Barata, granted a petition by Furnas Electric Power Plants, Inc. and overturned a ruling by Judge Salete Maccaloz of the Seventh Federal Court that had prohibited operation of the plant. Judge Maccaloz' ruling was the result of a suit brought by Deputy Carlos Minc (Workers Party, Rio de Janeiro), together with journalist Fernando Gabeira, in which they alleged that the plant was not safe. Furnas management announced yesterday that Angra I had already started firing up for a resumption of operations.

The plant was shut down on 1 October for replacement of the fuel (enriched uranium) and maintenance. It was to have started up again on 15 November, but that did not happen because of the ruling by Judge Salete Maccaloz. Attorney Marcelo Trindade, who is representing the plaintiffs Minc and Gabeira, has announced that he will challenge Judge Paulo Barata's decision in court.

In seeking permission to restart Angra I, Furnas management argued that the plant is important because it generates 656 megawatts (when operating at full capacity), that being the equivalent of 20 percent of Rio de Janeiro's energy consumption. The firm also submitted documents proving that the unit is inspected monthly by experts from the International Atomic Energy Agency.

Minc says that the court's decision was "incredible." He says that in 1986, Judge Walmir Martins ruled in favor of a petition by Minc and Gabeira in which they asked for an independent expert report on the plant. At that time, physicists Luiz Pinguelli Rosa and Anselmo Paschoa stated in their report that Angra I was not safe enough to operate.

#### **Congress Authorizes \$200 Million for Angra II**

90WP0033A Sao Paulo *GAZETA MERCANTIL*  
*in Portuguese* 4 Jan 90 p 13

[Report by Rio correspondent Fatima Belchior]

[Text] Furnas Centrais Eletricas, the company responsible for nuclear power plants in Brazil, has been authorized by Congress to invest \$200 million in Angra II in 1990. No further investment will be made in the Angra-3

nuclear plant, which means that work on that unit, which has so far been limited to initial site excavation, will be suspended for more than a year, at a minimum.

This information comes from Roberto Haig, acting president of Furnas, who was assured at the end of December 1989 that he could invest \$70 million of the \$200 million approved by the Congress in Angra II. These will be National Treasury funds, but the arrangements for the \$130 million are still to be worked out by Furnas.

Some of the buildings at Angra II, which is a project of Norberto Odebrecht Construction, are already completed and almost all the equipment has been purchased. Installation will begin in 1990 and should be finished by 1995, according to Eletrobras' latest revision of Plan 2010, which outlines the electricity-generating projects to be undertaken between now and then. Were Angra-3 to be funded, it would be ready in 1998 and would, like unit II, add 1,245 MW to Brazil's installed capacity of 54,500 MW by the end of 1989.

During 1989, Furnas spent about \$150 million on construction at Angra II. The nuclear unit that had been purchased from the German firm of KWU and transferred to Furnas by the former Nuclebras when the Brazilian Nuclear Program was restructured absorbed one-fifth of Furnas' total funds for the year. Furnas' budget was \$550 million, divided among hydroelectric generating projects and transmission systems such as the Itaipu system.

While it tries to arrange for funds to continue with work at Angra II, Furnas is working to improve the operation of Angra-1, purchased from the U.S. firm Westinghouse in the early 1970's. Hooked up to the electric power network in 1982, Angra-1 has been a headache for Furnas. Mistakes were found in both the design and the manufacture, and eventually there was a court suit against the manufacturer—but, according to Haig, Angra-1 ended 1989 with "excellent performance."

From January to October, when the plant was shut down for a change of fuel, it functioned almost without interruption at 80 percent of its capacity. A class action in the courts led to suspension of activity even after the second recharging of the reactor core and the maintenance work had been completed.

Angra-1 has a power rating of 626 MW; it can generate enough electricity to supply 20 percent of the needs of metropolitan Rio de Janeiro. Its reentry into the network at this year-end period was termed "essential" by the president of Furnas. "If we have to face summer without it, the system will be less stable and there will be more risk of a blackout," he commented, pointing out that Angra helps to maintain constant voltage during periods of high consumption such as the summer months.

#### Hydroelectric Plants

Even its \$200 million budget doesn't make the Angra II nuclear plant Furnas' main project for 1990. The Serra

da Mesa plant on the Tocantins river in Goias is at the forefront of the plans of this Eletrobras-controlled government corporation, although only \$140 million is expected to be spent on it.

Serra da Mesa, which would add 1,200 MW to the Furnas network in 1994, is "vital," according to Haig, to maintain a dependable power supply to the Federal District. Today, the nation's capital is supplied by lines that bring electricity from southeastern Brazil. These are expected to reach full capacity in 1994, at which time the loop is to reverse direction and carry power from the Federal District to the Southeast. So, keeping the work on Serra da Mesa going at a satisfactory pace would prevent strangulation of the supply of electricity to the Federal District.

#### Rare Earth Raw Material Exported to Japan

90WP0027C Sao Paulo O ESTADO DE SAO PAULO  
in Portuguese 4 Jan 90 p 10

[Article by Tania Malheiros]

[Text] Rio de Janeiro—Brazil has just joined the restricted club of countries that export so-called rare earth, which is a raw material composed of 16 chemical elements derived from monazite (a naturally occurring radioactive element that also contains uranium and thorium). This step by Brazil was made possible only by the setting up in Sao Paulo's Interlagos neighborhood of the first plant for separating monazite's components. The plant was built by Nuclemon [Nuclebras Monazite and Associated Elements, Ltd.] Minerochemicals, Ltd., an agency of the National Nuclear Energy Commission (CNEN), in partnership with the Japanese Santoku group, which provided the technology, and it exported its first 7 metric tons of the product 2 weeks ago in a deal worth \$182,000.

Until now the international rare-earth market has been dominated by the United States, the Soviet Union, Japan, France, China, and India. The Japanese transferred the technology for separating the byproducts in exchange for the export to Japan of from 12 to 16 metric tons of 12 rare-earth elements per month over a period of 2 years. Those products are used by the Japanese in the electronics industry. According to Nuclemon's industrial manager, Gilberto de Campos, the negotiations between the Japanese group and the CNEN began 2 years ago and were handled by the Nissho Iwai firm, which represents Nuclemon in the Far Eastern market.

"Over the next few years, we intend to bring to Brazil other firms that can provide us with important technologies for the production, for example, of advanced ceramics, superconducting magnets, and other high-tech products," he said. A metric ton of rare earths on the international market is currently worth \$26,000.

The Interlagos plant cost Brazil about \$2 million and occupies an area of 60,000 square meters, said

Nuclemon's manager. According to him, all the technology was transferred by the Japanese, but the equipment was manufactured and assembled by Brazilian industry. Campos added that the technology is so modern that only 30 technicians are needed to operate the plant in four shifts. The agreement does not stipulate any exclusive rights for the Japanese, and the separated chemical elements can be exported to other interested countries.

### Plants

Brazil is not going to export the uranium and thorium extracted from monazite. They are being stored at a CNEN facility in the municipality of Pocos de Caldas in Minas Gerais. "We are only exporting the surplus that is not needed by domestic industry. We want to supply our own market first and then think about the international market. We made the deal with Japan knowing that domestic industry would be well taken of," said Nuclemon's manager.

He added that Nuclemon processes 220 metric tons of monazite sands monthly from its mines and workings located in Bueno in the municipality of Sao Joao da Barra (Rio de Janeiro), Boa Vista in Itapemirim (Espirito Santo), and Cumuruxatiba in Prado (Bahia). After mining, the product passes through a process of beneficiation at four plants located in the same regions, where the tailings (worthless matter) are separated and returned to the ground. Campos said that the product yields monazite, ilmenite, zirconite, and rutile.

Ilmenite, which is used in the steel industry, is sold directly from the unit in Sao Joao da Barra known as the Praia Plant (Upra). The monazite is shipped to the Santo Amaro Plant (Usam) in Sao Paulo, where it is purified. Campos explained: "The monazite is crushed and subjected to a chemical process, and rare earths, thorium, and uranium are separated from it."

### Used in Nuclear Reactors

Rio de Janeiro—One of the 12 elements exported to Japan is gadolinium, which is used in the production of fuel for nuclear reactors, according to Gilberto de Campos. The 12 elements that are exported account for 8 percent of the total makeup of rare earths. Another element, cerium, is used in optical polishing and the manufacture of television screens. Other elements which Brazil does not intend to export are lanthanum, praseodymium, and neodymium—known as light elements—since they are of value to domestic industry. Two other components that are exported to Japan—yttrium and europium—are used to produce the red in color TV sets.

### USSR Invites Participation in Nuclear Research

PY0202125690 Rio de Janeiro *Rede Globo Television in Portuguese* 2200 GMT 2 Feb 90

[Text] Sao Paulo University physicists have enthusiastically received the announcement that Brazil will participate in the construction of a nuclear fusion reactor. The invitation was made by the Soviet Union to President-elect Fernando Collor during his visit yesterday to the Academy of Sciences in Moscow.

Like all physicists, Ivan Nascimento, director of the Sao Paulo University Physics Institute, dreams of the construction of a fusion nuclear reactor, the only kind that can generate electricity without radioactive waste. Professor Ivan Nascimento was an active participant in the talks between Brazilian and Soviet scientists that will now make it possible for Brazil to join the (?heater) reactor construction project in which the United States, Canada, Japan, European countries, and the Soviet Union are already participating.

This machine is a Tomahawk that belongs to the University of Sao Paulo and it is the only one in Latin America. It was built in Brazil 10 years ago. The (?heater), the new Tomahawk in whose construction Brazil will now participate, is much larger. The diameter of the vacuum chamber of this device is 60 centimeters; the (?heater) will have a diameter of 12 meters, and its power will be 100,000 times greater.

[Begin recording] [Reporter] What does this invitation to President-elect Collor mean for the Brazilian scientific community?

[Nascimento] I believe it is very important in that it recognizes Brazilian scientists are in a position to cooperate on equal terms with scientists of the highest level in the international community. [end recording]

### Ex-CTA Head Urges Emphasis on Space Effort

90WP0029B Sao Paulo *FOLHA DE SAO PAULO* in Portuguese 4 Jan 90 p A10

[Article and "excerpts" from interview with Brigadier General Hugo de Oliveira Piva of the Air Force Reserve by Roberto Lopes; date and place not given; first two paragraphs are *FOLHA DE SAO PAULO* introduction]

[Text] The segment of Brazilian industry currently concerned with the aeronautical and weapons markets should redirect its efforts to the space sector. That is the conclusion drawn by Brigadier General Hugo de Oliveira Piva of the Air Force Reserve, who is a former director of the Aerospace Technology Center (CTA) in Sao Jose dos Campos. Today Piva owns his own consulting firm called HOP. Its clients include INPE (National Institute of Space Research) and the Orbita Company, which was established by Engesa [Specialized Engineers, Inc.] and Embraer [Brazilian Aeronautics Company] to manufacture rockets and missiles.

The general says that negotiations aimed at Brazil's production of a military observation satellite for Iraq are at a standstill and warns of the harm the country will suffer if it does not obtain the technology for the Viking rocket. Here are the main passages from the interview:

[FOLHA] Why are you advocating a shift to the space sector?

[Piva] Because today there is a tremendous shortage of space flights available for scientific experiments. Many space research centers throughout the world are prevented from launching their satellites into the orbit—the "window"—they want because their programs have to be scheduled to match the availability of NASA's space shuttles or the openings available on launches by a space launching firm such as Arianespace. There are still far too few of those openings to meet demand.

[FOLHA] Does this mean that you approve of the agreement between Avibras Aerospace Industry, Inc. in Sao Paulo and the Chinese Government to form a space launch agency for Third World countries?

[Piva] Of course. And I feel that they are not going to receive orders only from the Third World. I feel that they will get a lot of contracts from more advanced countries which need to send satellites into lower orbits—which I would situate at an altitude of between 600 and 1,000 kilometers.

[FOLHA] Is Brazil in a financial and technological position to enter that market? We see the difficulty being experienced by the Air Force in developing the VLS (Satellite Launch Vehicle) rocket, which it now appears is not going to be ready until 1993.

[Piva] If it is not ready until 1993, the only reason will be the lack of money.

[FOLHA] Not to mention U.S. resistance to helping us. At the moment, they are trying to keep us from getting the technology for the French Viking engine.

[Piva] That would be very harmful to us in the future. The Viking is an excellent and very powerful rocket engine that was used in the first three versions of the French Ariane rocket. It is not intended for the VLS, which is much smaller than the Ariane, but we need to start familiarizing ourselves with it now so that when we want to move on to a stage subsequent to the VLS, we will be in a position to do so.

[FOLHA] And as regards satellites, are we already in a position to compete internationally? I recall that in June, a consortium consisting of Embraer, Orbita, and other firms submitted a proposal to the Iraqis for building a military observation satellite. What became of it?

[Piva] I feel that we can compete, but I want to say that the satellite for Iraq has nothing to do with a military satellite. It is a very basic and elementary satellite; like us, the Iraqis are just starting out in this field.

[FOLHA] Pardon me, but all the information we have says that it is in fact a satellite equipped with a high-definition camera suitable for taking military photographs.

[Piva] We might in fact be sure of that, but we cannot say so. The Iraqis stopped talking to us about the satellite precisely because it was reported in the Brazilian press. They were scared off, and the contract stopped right there. Those news reports caused us other headaches as well. We were prevented from importing some items because of the reports that we were going to sell a military satellite to the Iraqis. [end of interview]

#### Bad Year for Industry

Like 1988, 1989 was a bad year for the Brazilian arms industry. It was also a difficult year for Embraer. The manufacturer of the Tucano trainer did obtain some good orders for its line of civil aircraft, but it was forced to ask the government for a foreign loan of \$217 million (about 5.6 billion new cruzados at the parallel exchange rate) to defray the cost of the AMX attack aircraft program. The result was that its foreign indebtedness jumped to about \$600 million (about 15.6 billion new cruzados at the parallel rate).

Avibras in Sao Paulo is in a tight but stable situation. A few rocket exports to small countries on the Persian Gulf which use the Astros-2 rocket launching system (the star performer among that firm's exports) ensured the firm of modest revenues. The Engesa group continued to show signs of serious difficulty. Last year it sold off two subsidiaries: Engetronica and the FNV [National Railroad Car Company] (the latter a vehicle manufacturer considered to be in the best financial health of any company in the group). At the start of the second half of 1989, Engesa leaked to the press that by October at the latest, it would sign the much-discussed contract for selling Osorio tanks to Saudi Arabia. Nothing happened, and the latest information concerning those negotiations—which have been dragging on since 1986—is that the contract will be signed by February.

#### IPEN Official Surveys Achievements

90WP0033B Sao Paulo GAZETA MERCANTIL in Portuguese 30 Dec 89 p 12

[Report by Sao Paulo correspondent Rita Karam]

[Text] The Institute for Nuclear and Energy Research (IPEN), now responsible for the bulk of the progress made in Brazil in the nuclear field, has had to adjust its plans to the repeated changes experienced by the sector in 1989 with the abolition and restructuring of the Ministry of Science and Technology, which was accompanied by both cuts and supplements to the budget.

Even so, as we reach the end of the decade, the country can look back at some technological breakthroughs made this year. In the nuclear field itself, mastery of the nuclear fuel cycle was consolidated and the fuel is now

being used in IPEN reactors. "We have produced the compounds, enriched the uranium by the ultracentrifuge method, and succeeded in making the fuel," Claudio Rodrigues, superintendent of the institute, points out.

Another important project was the building of the prototype of a reactor that would generate as much as 50 MW of electricity from nuclear energy. Now in its advanced stages, this effort is being carried out in collaboration with the Ministry of the Navy, Rodrigues reported.

With a budget of 53.1 million new cruzados, (as converted by the December value of the BTN [National Treasury Bonds]), it was in the area of nuclear energy applications that IPEN and Brazil recorded one of their greatest victories, the obtaining of Iodine 125. This is a radioisotope that is often used in medicine to mark reagents during "in vitro" examinations, known as radioimmunoassays, that can diagnose thyroid disorders.

IPEN is supposed to supply the marker to the domestic market starting in March 1990, which would significantly lower the cost of such examinations. The same radioisotope is also being used to detect the hormone progesterone. The project, carried out jointly by IPEN and the School of Veterinary Medicine of the University of Sao Paulo (USP), contemplates using the technique to increase milk production. By determining the level of progesterone, farmers can calculate the date that a cow comes into heat and arrange to breed her.

Although Brazil has one of the largest dairy herds in the world, several organizations have been doing research into ways of boosting milk production. If it were possible to identify the best date for breeding the animal, more calves would be born. In developed countries, according to Jose Roberto Rogero, an IPEN engineer, every cow has one calf a year.

The institute is also studying ways to obtain Iodine 123 and thallium. Thallium is used primarily in diagnosis of cardiovascular disease.

Rodrigues believes that the new government will have to make a choice in 1990 as to whether or not to support the country's scientific and technological development. "Without backing, no [market] reserve can help us. If there is support, then the sector must be assisted, not by a [market] reserve, but with risk capital."

#### **Collor Addresses Soviet Academy of Sciences**

PY0302234690 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 2 Feb 90 p 4

[By Luiz Recena]

[Excerpts] Moscow—In the government of President-elect Fernando Collor, Brazilian scientists, invited by the Soviet Union, will be able to participate in the construction of a new nuclear reactor. The cooperation proposal was the most significant result of Collor's visit to

Moscow, which concluded yesterday. The importance of the proposal was emphasized by Brazilian Ambassador to the USSR Sebastiao do Rego Barros. He explained that this is the first concrete offer by the USSR for another country to participate in the new reactor project—a joint venture involving the USSR, the United States, Japan, and the EEC. Only the signatories of the first agreement can invite new partners.

The president-elect, who is now in Dusseldorf, West Germany, on the first leg of his European tour, wants to do business and engage in cooperation projects with the USSR. [passage omitted]

After a speech to the Soviet Academy of Sciences, Collor talked for about 1 hour with the leaders of that most important of Soviet scientific institutions. This institution is so important that each of its five [as published] vice-presidents has the rank of a secretary of state. The talk began when the president-elect asked what type of high technology the USSR could transfer to Brazil in the fields of environment, industrial pollution, and energy.

"We have a number of technologies that would be useful for Brazil, technologies that can yield positive results," responded Yevgeniy Velikhov, one of the vice-presidents. Guriy Marchuk [president of the Soviet Academy of Sciences], who has already visited Brazil, was not in Moscow.

The talk ended with concrete suggestions for cooperation between the USSR and Brazil in the fields of information science, metallurgy of noble metals, educational television, ecology, and environment. [passage omitted]

Collor invited the Soviet scientists to attend the World Congress on Environment and Development, scheduled for 1992 in Brazil, and to visit Carajas and other mining areas in Amazonia, and to visit other sectors in which there can be bilateral cooperation. The Soviets accepted enthusiastically. [passage omitted]

At Shemeretevo International Airport, the president-elect was accompanied by the same official who met him first, Anatoliy Lukyanov, the first deputy chairman of the USSR Supreme Soviet. Also present were Soviet Ambassador to Brazil Leonid Kuzmin and [Brazilian Ambassador to the Soviet Union] Sebastiao de Rego Barros.

Collor's youth delighted and charmed Moscow residents, who mainly monitored his visit over the radios, which gave details on the activities of the illustrious guest. The television and the newspapers also dedicated much space to the president-elect. His fondness of sports, his two races through the Hills of Lenin—where he resided—and his walks through the street made Collor a popular man in Moscow, whose residents will comment for a few days to come on his visit, the first one by a president-elect of a country outside the socialist bloc. [passage omitted]

**CTA Successfully Tests SLV Rocket Motor**  
*90WP0033C Sao Paulo GAZETA MERCANTIL in Portuguese 30 Dec 89 p 12*

[Text] Last Friday, the Aerospace Technical Center (CTA) successfully conducted the first test of the rocket engine that will serve as the first stage of the satellite launch vehicle (SLV). The test, done on the test bench of the CTA propellants plant, confirmed the complete burning of the charge of 7 tons of solid fuel that had been loaded into an engine tube measuring 1 meter in diameter and 6 meters long.

According to Colonel Antonio Carlos Pedrosa, director of the Space Activities Institute (IAE) and associated with the CTA, the solid propellant burned for 65 seconds. This is enough time for the SLV, flying at a speed of 4,100 km/hr, to reach an altitude of 24 km. Also tested was the secondary cold gases injection system at the tip of the nose cone, which makes it possible to guide the rocket during flight.

According to the measurements made by electronic sensors on the test bench, the secondary injection of freon gas generated a lateral force of more than 1,200 kg.

**Sarney Inaugurates Linear Electron Accelerator**  
*PY0702201890 Rio de Janeiro Rede Globo Television in Portuguese 1500 GMT 7 Feb 90*

[Text] President Sarney has inaugurated, in Sao Jose Dos Campos, the first linear electron accelerator. The Institute of Advanced Studies was in charge of developing the equipment.

Another six accelerators will be built by 1994. The accelerators are part of the national nuclear reactor program.

**CUBA**

**Castro Diaz-Balart Stresses Nuclear Achievements**  
*FL3001195090 Havana Radio Rebelde Network in Spanish 1222 GMT 30 Jan 90*

[Report by Angela Soto from the "Haciendo Radio" program]

[Text] The achievements attained and the efforts made during the first 10 years of the Atomic Energy Commission [CEA] and the Secretariat for Nuclear Affairs were reviewed for the press by Dr Fidel Castro Diaz-Balart, CEA executive secretary.

[Begin Castro Diaz-Balart recording] I think it is very important to stress this because we have reached a certain level now. Some modest progress can be seen in the development of our nuclear energy program primarily because we have had clear guidelines, precise objectives, and the direction and participation of our Communist Party of Cuba and government from the start, especially from our commander in chief. [end recording]

The CEA executive secretary also said that there are more than 150 units that use radioactive substances and ionization radiation, including 19 organizations of the State Central Administration, such as in the medical and industrial fields. Irradiation [radiofarmaco] is used in agriculture and in several areas of the national economy. One of the points stressed by Dr Castro Diaz-Balart was that in 1988, more than 600 nuclear science and technology graduates had dedicated themselves to the country's economy. They are true specialists forged by the revolution for the benefit of the people.

The executive secretary also noted that approximately 90 institutions throughout the country have received certificates for creating conditions indispensable to radiation safety. This has been recognized by the International Atomic Energy Organization, which has proposed to make Cuba a regional center for this very important area. Our country is also outstanding because of its nuclear safety system, which is subject to the same mandatory guidelines, requirements, and procedures that apply to people and institutions who work in the development of nuclear energy for peaceful purposes.

Delegations from seven countries from all the continents are visiting us on the occasion of the 10th anniversary of the CEA. The foreign representatives will visit institutions, tour the Juragua electronuclear center in Cienfuegos, and exchange expertise with Cuban specialists and technicians.

The main ceremony marking the CEA's 10th anniversary will be held in the Universal Hall of the Revolutionary Armed Forces on 3 February.

## BANGLADESH

**South Asia Nuclear Free Zone Proposal Welcomed**

51500058 Dhaka *THE NEW NATION* in English  
19 Nov 89 p 5

[Editorial: "South Asia—A Nuclear Free Zone"]

[Text] The political sub-committee of the United Nations recently adopted a resolution calling for declaring South Asia a nuclear free zone. This is indeed a welcome move and would have the endorsement of all peace loving nations.

The resolution, jointly moved by Bangladesh and Pakistan, was supported by 102 nations, thirty nations stayed away from casting their votes and only three nations—Bhutan, Mauritius and India—voted against the motion.

Bhutan perhaps had no option, but why should Mauritius, a small nation, vote against the motion is not easily comprehensible.

The resolution only reiterated the call for non-proliferation of nuclear arms in the region. The resolution called upon the nations of South Asia to make a concerted move in this direction and counselled the nations to stay away from any move directed against it.

The UN resolution sought the active cooperation of the super-powers in its drive to halt the proliferation of nuclear arms in South Asia.

The resolution has reflected the expressed desire of the peoples of the South Asia because they are peace loving and abhor war and conflict. They particularly support the move of making South Asia a nuclear free zone because no individual in his correct frame of mind can invite a confrontation in which nuclear devices will be used.

But a more important question is why should nations steeped in poverty, ignorance, and other social ailments choose to spend money to acquire nuclear arsenals. No nation in South Asia can afford the luxury of possessing nuclear arms leaving the teeming millions in starvation.

The nuclear arms race in South Asia also defies logic when viewed in the overall global perspective.

The two superpowers, USA and the Soviet Union, are engaged in exercises designed to cut both the nuclear warheads and other conventional arms. Proliferation of nuclear arms in any part of the world therefore appears ridiculous.

Bangladesh is firmly committed to the concept of making South Asia a nuclear free zone. Arms race of any kind not only creates imbalances but also creates distrust and misunderstanding among the nations. It disturbs harmony and impedes economic development which is so important for the hapless millions of the region.

## INDIA

**Development of Domestically Produced ICBM Backed**

BK2201142490 Delhi *PATRIOT* in English  
12 Jan 90 p 4

[Editorial: "India's ICBM"]

[Text] In the past two years, the Defence R & D [Research and Development] Organisation has developed a range of missiles for the armed forces—from "Nag", the anti-tank missile, "Prithvi", the surface to surface missile, to "Trishul" surface to air, and, finally, "Agni", the intermediate range ballistic missile [IRBM]. These developments are the results of the decision taken around 1981 that India will remain vulnerable without missile capability in the armed forces. The decision was hastened after China acquired missiles in the late 1970s. In retrospect, it turns out to be a judicious decision. In India's neighbourhood the Saudis have the IRBM, thanks to China. Pakistan has some missiles and is developing others (and failing which, it can get this from China). Iraq has a range of missiles and it has tested a rocket with the capability of an IRBM. Israel is also reported to possess a variety of missiles, including the IRBM. However the case of the intercontinental ballistic missile, ICBM, with a range of 5000 km, is different. The two super-powers and China have deployed them in their defence system while France and Britain have built them for their submarines and Japan has the capability. Dr A.P.J. Abdul Kalam, director of the Defence Research and Development Laboratory, has said that, if given the go-ahead, and provided the resources, India can build the ICBM. But the issue here is mainly political. Does the security environment of 1997 warrant our possession of the ICBM? In terms of relative priorities, with our per capita income being below 300 US dollars, should we go for the ICBM which we can make nuclear if the contingency arises? The objection on the ground of proliferation is largely irrelevant because proliferation has already taken place. If the ICBM is going to be as common in 2001 as the IRBM will be in 1993, why wait for that day, at least in capability building? After achieving competence, one can pause. The Government must not take a strong ideological stand against this.

## IRAQ

**Iraqi Missile Effort Said Aimed at Israel**  
TA0802123790 Tel Aviv *HA'ARETZ* in Hebrew  
8 Feb 90 p A2

[By Re'uven Pedatzur]

[Text] "The successful development and launch of the three-stage ballistic missile in Iraq has far-reaching strategic ramifications. Recent missile technology developments in Iraq must be taken very seriously. Israel's problem is not with the missile Iraq claims it will launch

into space, but with the presence of long-range ballistic missiles in Iraqi hands." This was the security sources' reaction to the report Iraq has built a satellite it soon plans to launch.

The security elements contend Israel should not ignore Iraq's growing capability to strike at its hinterland. They claim the chief Iraqi effort in developing ballistic missiles not only is aimed eastward, against Iran, but also against those perceived in Baghdad as serious enemies—the Israelis. It would be wrong to underestimate Iraqi announcements on successes in the development of missiles, as Western experts before have done. The Iraqi military industries have developed very rapidly, and their successes were largely surprising.

As far as known, the ballistic missile Iraq successfully launched two months ago is based on the Soviet surface-to-surface Scud B missile. The Scud is an obsolete USSR missile found also in Egypt and Syria. The success of the Iraqi scientists was manifested in the ability to develop or procure and adapt technologies that make possible manufacture of a three-stage ballistic missile.

In the development process, the Iraqis managed to increase the missile's range to 1,000 km. A missile with that range can cover any target in Israel. The Iraqi deputy minister [not further identified] was quoted as saying the missile was developed for civilian purposes, but any country that can launch a missile to such heights also can direct it against the target it selects.

It appears that, contrary to the Iraqi spokesman's remarks, Iraqi scientists developed the missile with outside assistance. Its success is based on cooperation with French scientists and the transfer to Iraq of French missile technology.

#### Government Ready To Launch Satellite

NC0702143390 Paris AFP in English 1421 GMT  
7 Feb 90

[Text] Abu Dhabi, Feb 7 (AFP)—Iraq is ready to launch two versions of a domestically-produced satellite that will serve non-military purposes, an Iraqi official said in an interview to be published here.

'Amir Hammudi al-Sa'di, under secretary at the Iraqi Ministry of Industry and Military Industrialization, told the magazine AIRFORCE that the satellites were "produced and designed solely by Iraqis."

The official, quoted in an advance copy of the magazine that goes on sale next week, did not specify the launch date but said the satellites were to be used for scientific purposes.

In December, Iraq announced that it had developed and tested a three-stage rocket, named Al-'Abid (the worshipper), capable of sending a satellite into space. U.S. intelligence reports confirmed the announcement.

Mr. Sa'di denied that Iraq had sought help from China and other countries to produce the missile system, which he said had been planned since shortly before the August 1988 cease-fire in the Iran-Iraq war.

"Iraq had tried to do so but found all doors were closed", he said.

#### ISRAEL

##### Nuclear Research Center Head Interviewed

TA0202171390 Tel Aviv IDF Radio in Hebrew  
0905 GMT 1 Feb 90

[Telephone interview with Gid'on Shavit, head of the Nuclear Research Center Negev (NRCN) Marketing Department and director general of Rotem Industries, by Gay Zohar, from the "Right Now" program; date not given—recorded]

[Text] [Zohar] Gid'on Shavit, head of the NRCN marketing department and director general of Rotem Industries, shalom.

[Shavit] Shalom.

[Zohar] Do you represent the absolutely overt aspect of the NRCN?

[Shavit] Yes. My job is to make commercially viable products from technologies born of NRCN scientific research. As such, we have a wide range of connections in Israel and abroad with companies and other privately owned bodies. That is why it is all open and known.

[Zohar] Meaning that the NRCN deals with defense issues, which no one ever talks about or is ready to comment on, such as in the Vanunu case. At the same time, it is engaged in day-to-day business and commercial enterprises revolving around the same developments relevant to REFA'EL [Armament Development Authority] and other defense industries.

[Shavit] Yes. The NRCN is a nuclear research institution linked with the Atomic Energy Commission, which belongs to the Prime Minister's Office. In this framework we have a company, also connected with the Prime Minister's Office, called Rotem Industries, of which I am director general and which mainly deals with the international ties needed to implement and market technologies used in NRCN scientific research and development. This is how we are trying to develop advanced industries in the Negev.

[Zohar] It would be true to say, however, that even you in Rotem do not give too many media interviews.

[Shavit] We do not give too many interviews because IDF [Israel Defense Forces] Radio does not get here too often.

[Zohar] Well, we are here now. Are you developing civilian products in the NRCN? Is there such a thing?

[Shavit] To say products as such is not exactly accurate. We, as a research institution, are more typically involved in research and development. We have research and implementation teams in the NRCN. We deal with diverse and interesting topics. We make every effort, in the commercial area, to increase the income of the State of Israel. It is very important to us to expand activity in this area, particularly in view of the situation in the Negev. With this in mind, we have set up an industrial park near Dimona in which we are commercially active.

[Zohar] Could you please briefly review the various topics the NRCN deals with and can be mentioned here?

[Shavit] I will give you a detailed account of everything we do in the following product families:

The first area, electro-optics, is divided into three groups. The first is lasers, quite a unique group for us; the second is crystal growth; and the third is optical systems, for which we have established a subsidiary called Rotlex Optics.

The second field of our activity is detection and identification, both in terms of detection and identification of gases and in detection of radiation—which naturally is our specialty.

The third group develops various materials and processes. Here we have an issue that is uniquely ours—producing uranium from phosphoric acid.

[Zohar] Is it unique for Israel?

[Shavit] Other countries know how to produce uranium from phosphoric acid, but we have a unique method—and as you may well know, Israel has a lot of phosphoric acid not far from us in Dimona.

The fourth area is the environment, which today is a fast-developing issue in the world. The NRCN has much to contribute to the state in this respect by advising, conducting research, and even through monitoring systems we can operate.

[Zohar] Is there no contradiction between what we know of the atom and its destructive effects and dealing with environmental quality?

[Shavit] No, there is not. The nuclear industries are known for their awareness of the environment and desire to maintain its high quality. We know how to implement our expertise in this area in other research centers, because we are a scientific nuclear center.

[Zohar] Would I be right in saying what you are marketing are by-products of other NRCN activities?

[Shavit] Yes, of course. The NRCN was founded and has been known as a research institute for many years. At its outset, it did not deal with such topics. The area I am in charge of is relatively young.

[Zohar] How long has it existed?

[Shavit] I would say the area has been dealt with for some 5 years, but the past 3 years have seen more intensive activity on our part. This mainly is a result of the NRCN becoming mature and well established. There furthermore have been budget difficulties, coupled with our desire to expand our income. The government approved our developing and expanding—in this region in particular—of additional activity which would increase the spectrum of our resources and sources of income.

[Zohar] Were you involved in activity in the NRCN even before this? As far as you are concerned, was this a stepping out of the shadows?

[Shavit] I am quite an old-timer in the NRCN. I used to head the finance department, and I now am in charge of marketing.

[Zohar] How did this transition affect you? The NRCN's activity always has been secretive and mysterious, and even today very few discuss it.

[Shavit] Look, for me personally, it was no great change. The financial area is relatively close to the business and marketing aspects. It was quite natural.

[Zohar] How was it as far as the scientists in research are concerned? They always have worked for a single client, and all of the sudden they step into some sort of competition with many other companies and people in the world, which means they also have to prove themselves elsewhere.

[Shavit] This is a very good question. This change or shift in concept has not been easy. These are people who were used to doing research but suddenly must comply with competitive specifications or activities. It was not easy and did not happen overnight. We have invested quite a bit in teaching the marketing aspect—which has been the weaker side—to those scientists. We still are investing a great deal in it. Adopting the concept of commercial production when compared to one of research per se was not easy. Let me give you one example: When you deal with this aspect, you must provide what the client needs, not what is asked of you when you have a budget. This is a substantial change.

[Zohar] To what extent does the credit the world gives us in the nuclear field act in your favor and balance out your lack of experience?

[Shavit] The credit is there. We have very distinguished research teams in certain aspects. Not in all aspects, because we do not deal with all aspects. In those we are in, we are definitely first rank. In terms of nuclear research, Israel as a small country has more significance in quality than quantity.

[Zohar] It is often said perhaps it is not the size, but the knowledge, the quality.

[Shavit] There is quality. We have unique know-how. After all, we have engineers and scientists who have been

maintaining a very high standard and have both experience and competence. We are trying to translate our skills into business terms.

[Zohar] Recently, and particularly from the time of the Vanunu affair, there has been a sort of public debate on the nuclear issue in Israel. This sort of debate before has not existed. Is there such a debate in the NRCN, or is everyone taking it for granted and not asking too many philosophical questions?

[Shavit] Look, we at the NRCN know exactly what we have achieved and what we are doing. As far as we are concerned, we have been working in this field from the beginning of the nuclear research, which is our main field of work. It will remain such; we are not turning into a business. The activity I am in charge of will always be an additional one; it will never become the main component. It will, however, gain standing as a very important component.

[Zohar] These days, however, there are people who maintain the NRCN and all the knowledge the State of Israel has should be opened in a way similar to other countries who have done so one way or another. Why do you not make your activity public so people in Israel know what is happening in the NRCN in Dimona, and not only in the civilian aspect?

[Shavit] Our activity is being published. We have scientific publications. These are the kind of things you do not read about in the newspaper. The same is true for all scientific publications. Take the Weizman Institute or

the Technion [Israel Institute of Technology], for example. Their publications or activities are not made public too often. Like the Weizman Institute, we publish and there are publications of our activities. Our men attend congresses, publish, are known in the scientific community, and are widely known in professional circles.

[Zohar] Gid'on Shavit, this is your first radio interview. Do we bite?

[Shavit] It was nice, thank you.

[Zohar] Thank you, and a nice day to you.

## PAKISTAN

### Official Leaves for Paris Nuclear Plant Talks

BK3101024890 Islamabad Domestic Service  
in Urdu 0200 GMT 31 Jan 90

[Text] The foreign secretary has left Islamabad for Paris to hold talks with French Government leaders on bilateral, regional, and international matters. ASSOCIATED PRESS OF PAKISTAN, quoting official sources, said that he will finalize the program of French President Mitterrand's visit to Pakistan scheduled for next month.

The foreign secretary is also expected to hold talks on the purchase of a French nuclear plant. Pakistan needs the plant to increase power generation to meet its energy requirements.

**Radiation Leak at Kalinin Nuclear Station**

*LD0202073590 Moscow Domestic Service in Russian  
0500 GMT 2 Feb 90*

[Text] This week the editorial office of SOVETSKAYA ROSSIYA has had an onslaught of telephone calls connected with rumors about an extraordinary occurrence at the Kalinin Nuclear Electric Power Station [AES].

We have just spoken with Kursk on the air, there were rumors of an explosion at the Kursk AES, and now Kalinin. (Sidorenko), deputy chairman of the USSR State Committee for Industrial Supervision, was approached for an explanation. He announced that a leak of radioactive water had in fact taken place on 5 January at the Kalinin AES. Due to a blunder by personnel, about 20 cubic meters flowed onto the roof of the machine department, and then got into a cooling-water duct. A special commission which was engaged in the investigation came to the conclusion that the surrounding territory was not subjected to radioactive pollution, and that the roof of the turbine hall was polluted. The people who eliminated the consequences of the accident received no more than 1.5 percent over the permissible norm. Cases of this kind are not rare at nuclear power stations, but the union-level commission which came to Kalinin this time was needed, because the local inhabitants do not trust the information coming from the AES's leaders very much.

People's alarm is explained by other material in today's issue of SOVETSKAYA ROSSIYA which reports that a register of people radiated after the Chernobyl catastrophe has been created.

**'Kirov' Commander Denies Radiation Leak Reports**

*PM0102112190 Moscow KRASNAYA ZVEZDA  
in Russian 31 Jan 90 First Edition p 2*

[Telephone interview with Captain Second Class V.I. Rogatin, commander onboard the cruiser "Kirov," by Captain First Class D. Ilyuk, senior editor of Northern Fleet newspaper NA STRAZHE ZAPOLYARYA, under "Rumors and Reliable Sources" rubric: "'Kirov' Returns to Base"—date not given; first paragraph is editorial introduction]

[Text] Rumors have spread across Severomorsk, and indeed even farther, that there has been a radiation leak aboard the nuclear missile cruiser "Kirov," which is now returning ahead of schedule from a long-distance cruise, and that the crew have been exposed to radiation. Capt First Class D. Ilyuk, senior editor of the Northern Fleet newspaper NA STRAZHE ZAPOLYARYA, contacted the ship by ship's wireless.

"Captain Second Class Rogatin, cruiser commander, speaking."

[Ilyuk] Vladimir Ivanovich, what truth is there in the rumors about an unfavorable and alarming radiation

situation aboard your ship? It is being said that something happened to the nuclear reactor which has resulted in the cruiser's early return home.

[Rogatin] Well, the "Kirov" seems to attract rumors. No doubt you will remember how KOMSOMOLSKAYA PRAVDA spread a rumor that we had suddenly turned up in the region of Iceland, whereas in fact we were in our base at that time.

On your question specifically I can say that the condition of the ship and its main power unit—the nuclear unit—is normal and enables the "Kirov" to perform its usual tasks. All the crew members are alive and well.

[Ilyuk] But you are returning early nonetheless. Is there a reason for that?

[Rogatin] Higher command has decided that the ship should return because a gas leak was suddenly discovered in section one of the number one steam generating unit at the beginning of January. We took that unit out of service. Even so, the radiation situation was and remains normal. The gamma background aboard the cruiser is within the natural background limits. Therefore, there is no threat to the ship or the life or health of the crew.

People may ask: Why was the unit taken out of service then? The answer is that it was to guarantee that the gas leak wouldn't develop further. With the kind of leak that we had the operating instructions allow the steam generating unit to be used. But this is peacetime and the command decided to completely preclude all unforeseen eventualities, all risk. When the ship has returned to base industrial representatives will remedy the fault.

[Ilyuk] Vladimir Ivanovich, you said that everyone aboard the ship is healthy. But has no one fallen ill among the cruiser's several hundred crew members?

[Rogatin] Yes, I wasn't being completely precise, there are sick people on board, but their ailments have nothing to do with radiation. There are seven people in the sick bay: three with catarrhal infections, two with fungal growths on the skin, one with hypertension, and one with a bruised finger. I could give you their names.

[Ilyuk] I don't think that's necessary. I should like to hear how the crew feels about returning home, how the sailors greeted the early recall.

[Rogatin] In short, they are cheerful, as you'd expect. Although many of them do feel a certain dissatisfaction, of course—after all, they weren't able to completely carry out their tasks.

[Ilyuk] One last question. What wishes do you have for the families and friends of the crew?

[Rogatin] First, that they shouldn't believe rumors. Second, that they shouldn't be concerned for us, everything is in order here. And third, get ready to meet us.

[Ilyuk] I wish you a successful return to base.

**'Rumors' of Radiation Leak on 'Kirov' Denied**

LD3001085290 Moscow TASS International Service  
in Russian 0652 GMT 30 Jan 90

[Text] Murmansk, 30 January, (TASS)—The commander of the nuclear-powered cruiser Kirov, which is on combat duty a long way from base, has refuted rumors to the effect that an accident occurred in the ship's reactor section and the crew received a large dose of radiation.

In a radio interview with Dmitriy Ilyuk, a fleet journalist, published in the local paper POLYARNAYA ZVEZDA, the vessel's commander, Captain Second Class Vladimir Rogatin, said that "the state of the vessel and its main nuclear power unit is normal and allows normal work to continue. All the crew are alive and well. The cruiser is being recalled from combat duty ahead of schedule because of the discovery of a gas leak from the first phase of No 1 steam-generating unit. We shut down this apparatus. From the moment the fault was discovered to the moment the apparatus was switched off, the radiation situation was and remains normal. The gamma-background on the cruiser is now 17-20 microroentgens per hour, which is within normal background limits. So there is no danger at all to the vessel, or to the life and health of the crew."

"The Kirov has been the subject of rumors before," the cruiser's commander said. "Many people no doubt remember how, not so long ago, we suddenly found ourselves off Spain, where the crew allegedly refused to carry out the instructions of the commander. Yet in reality, the cruiser was at the time anchored at its base."

**Chernobyl News Conference on Power Station Future**

PM0102121690 Moscow IZVESTIYA in Russian  
28 Jan 90 Morning Edition p 2

[Special correspondent V. Zaykin report on news conference at Chernobyl Nuclear Power Station: "To Be or Not To Be for Chernobyl Nuclear Power Station"—date not given]

[Text] Chernobyl Nuclear Power Station—A news conference for Soviet and foreign journalists was held in the Chernobyl Nuclear Power Station conference hall. Representatives of the nuclear power station's administration and the Atomic Energy Institute of the State Committee for Supervision of Safe Working Practices in Industry and the Atomic Power Industry, and the USSR Ministry of Nuclear Power Generation and the Nuclear Industry tried to clarify as fully as possible the present situation at the power station.

Three power units are now operational. The first and third operate at their rated capacity, while the second operates at 50-percent capacity because of hitches that arose. On 26 January the power unit was shut down for 40 days of maintenance work.

The situation today is that a real threat of closure hangs over the Chernobyl Nuclear Power Station. The public, in whose eyes the power station is a symbol of radiation danger, calls for its closure. USSR Supreme Soviet deputies also advocate the closure. The aim of the news conference was therefore first and foremost to explain the safety measures in the operation of the atomic facility which have been implemented since the disaster.

If you are not a specialist it is difficult to grasp the specific features of the work done; merely listing the work would take some time. A system has already been introduced for monitoring the condition of the metal; then there is a fundamentally new system that prevents the operator from interfering arbitrarily with the reactor shield [zashchita], which rules out the possibility of so-called "human error." But the main argument, in my view, was this: Whereas formerly during "irregular situations" the operator was under instructions to keep the reactor operating, now the directive is entirely the opposite—the reactor should be shut down. From now on the safety of the nuclear power industry comes first, and the plan comes second.

Is a chain reaction possible in the fourth power unit, or rather, in what is left of it? The specialists from the Kurchatov Atomic Energy Institute reply unequivocally: It is impossible. More than 70 holes have been drilled within the "sarcophagus." Instruments do not record a process of neutron breeding. But the specialists also shared their concern. During the accident nuclear fuel fused with metal, stone, and sand. Dust containing plutonium particles is now a serious danger. Its spread should be prevented by a dust suppression device operating inside the "sarcophagus."

Radiation directly above the damaged reactor today stands at 800 roentgens an hour. In various parts of the "sarcophagus" it varies from 200 roentgens an hour to only a few milliroentgens an hour, while in the premises that are in operation it is up to 8 milliroentgens an hour. The average dose (per person) for the station's personnel in 1989 was 1.23 roentgens over the year, where the permitted norm is 5 roentgens a year. More than 5,000 people are involved in operating the station. They all undergo psychophysiological examination every year. The station is under the protection of soldiers from the internal troops who are doing their compulsory service. Some 20 percent of personnel are young specialists who came here mainly in 1987. Today they hold key posts at the middle management level at the Chernobyl Nuclear Power Station.

Those, in short, are the arguments "for" the station. The station's administration and the nuclear specialists have, of course, many more arguments. But it is for the public to decide how weighty they are. The organizers of the news conference call on people to decide the question: "The Chernobyl Nuclear Power Station—to be or not to be?"—with a cool head, not relying solely on emotion, but heeding the voice of reason.

**New Center Set Up for Chernobyl Decontamination**

*LD2901160290 Moscow Domestic Service in Russian  
1400 GMT 29 Jan 90*

[Text] A new organization has been created in the Chernobyl area, the "Pripyat" scientific-production association. It will undertake the organization and co-ordination of research work and the testing and introduction of effective decontamination methods.

Within the framework of the association an international scientific center is being created. This initiative is supported by the IAEA, and already companies from 26 countries and 8 international organizations have applied to participate in it. And so, finally, Soviet and foreign specialists will be able to study the whole experience of eliminating the effects of the Chernobyl nuclear power station accident.

## CANADA

### Darlington Nuclear Plant Gets Approval To Boost Power

51200008 Toronto *THE TORONTO STAR* in English  
29 Dec 89 p A2

[Article by Daniel Girard]

[Text] Ontario Hydro's Darlington nuclear plant should be producing enough electricity for 90,000 people within a week.

The Atomic Energy Control Board decided yesterday to allow Hydro to increase to 20 per cent power in the Unit 2 reactor.

"It's important, very important. We'll now be able to produce power and that's what we're here for," said Sue Stickley, a Hydro spokesperson at the \$12.5 billion plant in the Town of Newcastle. The recently repaired Unit 7 at Pickering is expected to be back in service early next month.

Increased power from Pickering and Darlington will help reduce chronic power shortages like the one this month that saw factories shut down and pleas to consumers to cut back on electricity. Hydro spokesperson Douglas Armour said.

Even though the power from Darlington will only supply 40,000 homes and cannot be guaranteed until tests are completed, every little bit helps, he said.

An all-time peak consumption level is expected sometime in January, Armour said.

Hydro hopes to apply for a licence to boost power to 100 per cent in the reactor next month, said Stickley. The unit will provide power for 500,000 people when fully operational.

The plant's four reactors will produce electricity for 2 million people when at full capacity by the end of 1992.

The board denied Hydro a licence to increase power in the reactor to 20 per cent Dec 7 because a backup for Darlington's computerized shutdown system wasn't in place and the utility hadn't solved its dispute with Newcastle over fire safety and the building code.

But board president Rene Levesque said yesterday in a statement: "The board was satisfied that the safety measures in place were acceptable to run the reactor at this power level."

A temporary backup system has been installed in the reactor to allow Hydro to do further testing while board staff examine the unit's second computerized shutdown system.

The board, responsible for regulating all uses of nuclear energy in Canada, said its staff must complete its review

of the second system before Hydro can apply to have the power increased beyond 20 per cent.

That review will begin Jan 8.

### Construction of Prototype MAPLE-X Reactor Approved

51200009 Ottawa *THE OTTAWA CITIZEN* in English  
5 Jan 90 p B1

[Article by C. B. Pappin and Joanne Laucius]

[Text] Chalk River—Construction is to begin this spring on a fourth nuclear reactor at the Atomic Energy of Canada Ltd research station here.

AECL announced approval Thursday for construction of the \$30-million MAPLE-X reactor.

It will produce isotopes, which will be marketed to hospitals and research facilities for use in radiotherapy machines, medical diagnoses and equipment sterilization.

A spokesman for the Chalk River Nuclear Laboratories, John Perehinec, said Thursday the new reactor will free up research time on the existing NRX reactor, which is currently used for both research and isotope production.

The decision follows a series of hard times at Chalk River, where federal funding has been cut in half in recent years. The cuts were a blow to the Deep River area, which has no other industry.

"It makes us feel a little more at ease, for the time being anyway," said Deep River Mayor Lyall Smith, who works at the Chalk River complex.

Planning for the MAPLE-X has been going on for several years and a foundation has already been installed for the reactor building.

"Now we can finally see real work," Smith said.

Under federal legislation, the project has to receive Atomic Energy Control Board approval at three phases—site development, construction and operation.

Perehinec said a start-up date for the reactor will be decided later.

The new reactor will serve as the working model for the MAPLE-X, which was developed at the Chalk River Laboratories.

"Nobody's built one of these before," said Perehinec. "It's a prototype for research reactors that we're trying to market to other countries."

Isotopes produced by the MAPLE-X will be marketed to the medical community through Nordion, an AECL spin-off company.

Friends of the Earth policy director Kai Millyard said he was not concerned about the safety of the new reactor because it will not be a large-scale power producer.

However, he said he would have some concern if the announcement means the federal government has made a commitment to further research for nuclear power.

"The market doesn't want it, people don't want it, and the private sector wouldn't touch it with a 10-foot pole," Millyard said. "It's an absurdly expensive form of energy."

Norm Rubin, Energy Probe's director of nuclear research, said building a MAPLE-X demonstrates "sloppy or desperate thinking."

Rubin said AECL is wasting money by investing in the MAPLE-X at the same time it is attempting to privatize Nordion.

The future of nuclear medicine lies in isotopes produced by particle accelerators, or cyclotrons, and not those produced by reactors, Rubin added. "I doubt if the investment community would be convinced it's a winner."

Cyclotrons can be used to produce isotopes with a shorter half-life, or radioactive period, thus creating fewer storage and transportation problems, he said.

But Civic Hospital chief of nuclear medicine, Dr Karen, Gulenchyn, said medical cyclotrons are rare in Canada—there are currently three such cyclotrons in Canada—and the isotopes they produce don't have the versatility of those produced by reactors.

The short half-life of some isotopes produced by cyclotrons can be a liability for a medical team trying to coordinate shipping the isotope and booking a patient for treatment, she said.

#### **WINDSOR STAR Hails Report of U.S. Naval Nuclear Cuts**

51200007A Windsor THE WINDSOR STAR in English  
19 Dec 89 p A6

[Editorial: "U.S. Navy—The Nuclear Strip"]

[Text] A report that the United States has been dismantling its naval nuclear arsenal can only help further ease the tensions between Western democracies in the North Atlantic Treaty Organization (NATO), and the Warsaw Pact, NATO's East European counterpart, led by the Soviet Union.

Relations between the two blocs improved considerably after the signing of a medium range ballistic disarmament agreement by the U.S. and the Soviet Union two years ago. Improvements accelerated with Soviet leader Mikhail Gorbachev's restructuring efforts which opened the door to new freedoms in Soviet satellite societies.

The unexpected slackening of Communist rule in most East European countries has overshadowed, to a certain extent, the disarmament negotiations between the two superpowers.

News of U.S. naval nuclear cuts comes from the Greenpeace organization, which obtained it under the U.S. Freedom of Information Act.

It shows that over the last two years the U.S. eliminated one-third of its tactical naval nuclear arms; ballistic missiles with a range of less than 2,400 km were reduced to 2,500 from 3,650; surface ships capable of firing nuclear weapons were cut to 49 from 187.

The figures may create the impression that Washington has gone on a nuclear "stripping binge," but that's not so.

Navy officials have made it clear that the "retirement" of nuclear systems should not be interpreted as "having anything to do with naval arms control."

But even if the requirement is only limited to obsolete weapons pending their replacement by new, more efficient systems, it would have not taken place had not the U.S. administration felt comfortable in its relations with Moscow. In such a case the new armaments would have been in place before any of the older systems were retired.

The U.S. initiative gives the Soviet Union a numerical advantage in naval nuclear power—but not necessarily in striking force and efficiency—and places the Soviet Union in a terrible disadvantage in the eyes of the world.

It leaves it up to Gorbachev to serve.

#### **FINLAND**

#### **Nuclear Waste Transported to Southern Urals**

LD0102185790 Helsinki Domestic Service  
in Finnish 0900 GMT 1 Feb 90

[Excerpt] The Soviet nuclear power authorities have confirmed to Imatran Voima [national power company] a location for used fuel from the Loviisa power station. The used nuclear fuel will be transported from Finland to the Chelyabinsk nuclear waste treatment plant in the southern Urals. From the used uranium, uranium suitable for fuel will be recovered. The remaining high active nuclear waste will be cooled in over-ground stores for 20-30 years and it will then be buried in the bedrock. [passage omitted]

[Helsinki Domestic Service in Finnish at 1030 GMT on 1 February adds that used fuel from the Loviisa power station has been transported to Chelyabinsk nine times since 1981.]

## SPAIN

### Damage at Almaraz II Nuclear Plant Described

90WP0024A Madrid *EL INDEPENDIENTE*  
in Spanish 29 Dec 89 p 27

[Text] Madrid—At dawn yesterday the Almaraz II nuclear power plant in Caceres sustained damage causing a discharge of the reactor and the shutdown of the atomic complex. As a spokesman for the plant remarked, the shutdown occurred as a result of a fluctuation in the electrical voltage. On 27 December, Almaraz II underwent an unprogrammed shutdown for this same reason. The latter coincided with a planned shutdown of the atomic complex's No. I generator to repair a primary circuit valve in the reactor, which is the one containing water with a high radioactivity index.

The new damage, which occurred at 0600 hours, did not cause any escape of radioactivity. Sources from Almaraz II claimed that the reactor went into operation again at 2000 hours last night, 14 hours later.

#### Stopped Tubes

Moreover, as this newspaper has learned, a week ago 144 steam generator tubes at Almaraz II were stoppered after the discovery of internal leaks and defects from corrosion and vibrations. The large number of stoppered tubes shortens the life of the steam generators even more, requiring a reduction in the plant's operating power.

The stoppering was done after an inspection had been made of the generator set, on the occasion of a programmed shutdown for loading nuclear fuel.

Steam generators are an essential part of the PWR, or pressurized water type nuclear reactors, and are responsible for exchanging the heat of the water in contact with the fission process in the reactor with that of the secondary circuit, from which the water vapor is sent to the turbines to produce electricity.

Any leak in the 4,000 tubes in a steam generator could entail an escape of radioactive water from the primary to the secondary circuit. If many tubes are left unusable the plant has to reduce its power, because the cooling capacity of the water circuit in contact with the reactor is cut.

These flaws have been discovered in nearly all the type D-3 steam generators made by the U.S. multinational firm, Westinghouse. In Sweden, in one of the generator sets at the Ringhals nuclear power plant, a change had to be made in the steam generators owing to the high percentage of stoppered tubes. At Almaraz, the shutdown of the power plant for several months would represent a large financial investment.

#### Large Investment

Sources from the owner companies claimed some months ago that a generator change would occur in 1993,

but the high rate of stopped tubes during the recent inspections will cause the predicted date to be put forward.

Almaraz I and II are owned by four electric companies, with the capital distributed as follows: Spanish Hydroelectric (6.021 percent), Seville Electricity (36.021 percent), Iberduero (16.666 percent), and Fenosa Electric Union (11.292 percent).

Added to this problem is the imminent saturation of the pools storing high activity residues at Almaraz I, predicted by the end of 1992, according to internal reports from the administration. With the lack of a centralized residue storage place anywhere in Spain, it is planned to expand the facilities or to remove the residue elsewhere in special containers, which could foreseeably evoke citizens' protests. Almaraz I went into operation in 1980; No. II group in 1983. Both have a power of 930 MV.

### CSN Criticized for Supporting Vandellós I Reopening

#### Partiality Charged

90WP0025A Madrid *DIARIO 16* in Spanish  
3 Jan 90 p 9

[Text] Tarragon—The World Information Service on Energy (WISE) and the L'Ametlla de Mar Antinuclear Committee (of Tarragon) have forcefully criticized the Nuclear Safety Council [CSN], because they do not consider this agency to be neutral in its actions.

According to those associations, CSN is developing a strategy that could permit the reopening of the Vandellós I nuclear power plant despite the serious accident sustained by this nuclear plant on 19 October of last year, which placed the plant in a state of safe shutdown.

In response to the news that the Nuclear Safety Council, in the report that it is drafting, will not request that the Ministry of Industry and Energy permanently shutdown Vandellós I, because it considers the plant to be safe and the risk of its undergoing radioactive leaks to be minimal, the L'Ametlla de Mar Anti-Nuclear Committee and the World Information Service on Energy have made public a joint communiqué in which they accuse CSN of a "lack of neutrality."

Those ecological organizations describe the leaking to the media of the report on the reopening of the atomic plant that jeopardized the lives of thousands of citizens last October as "a provocation" on the part of the economic and political groups associated with Vandellós I.

The two groups regard the reopening of Vandellós I as "an offense against the resolution unanimously approved in the Parliament of Catalonia." The mayor of L'Ametlla de Mar, Pere Margalef, for his part, has warned that, if Vandellós I should resume its operations,

"some very serious things will happen. If the plant goes into operation, it will mean that life has no importance compared with money."

Pere Margalef thinks that the decision on the nuclear plant's future depends solely and exclusively on the central government, and hence the future of the nuclear plant "entails a decision that must be political." He also adds that he has no confidence in CSN, because he does not regard it as an independent agency, but rather one which caters to the interests of the electric companies.

Of the five mayors of the nuclear belt towns, the least critical one is the mayor in the locality of Vandellós, Carles Barceló, who has stated that the town hall headed by him will abide by whatever CSN says.

The improvements in security that must be made in the aforementioned nuclear power plant as a result of the accident could cost about 40 billion pesetas. Despite the size of the figure, the HIFRENSA company (Hispano-French Nuclear Energy, Inc) intends to put the reactor into operation again.

A sizable portion of these investment-losses will be assumed by the holding company of the power plant's insurance firms, and it is likewise thought that the investment will be profitable and easy to amortize, because Vandellós I has an operating permit lasting until the year 2003.

#### PP Cites Lack of Confidence

90WP0025B Madrid *DIARIO 16* in Spanish  
4 Jan 90 p 11

[Text] Madrid—Yesterday PP [People's Party] charged that the Nuclear Safety Council (CSN) is not fulfilling its duties, is opposed to progress, and is dominated by political commissars, according to a statement made to Europa Press by the deputy in charge of energy affairs, María Teresa Esteban Bolea.

The conservative deputy claimed that it is essential for CSN to operate and perform the fundamental task assigned to it, and for people to regain confidence in this area.

The People's Party group will adopt various initiatives in Congress in an attempt to resolve this situation. They have begun by requesting the tapes that the emergency room should have containing the conversations held on the day of the fire between the Vandellós I power plant, the civil government of Tarragon, and CSN itself.

Nevertheless, the PP deputy has no hope of their being turned over, in view of the position maintained by the Socialists in this regard. The deputy thinks that, with those tapes, the public could receive information that it considers to have been concealed, regarding what happened that day.

She also thinks that it is not a radioactivity issue, but rather one involving the Civil Defense organization and CSN.

This group will also request the appearance in Congress of a CSN council member, the civil governor of Tarragon, and the Spanish engineer, Dolores Carrillo, who left CSN two years ago after charging that the Tarragon Nuclear Energy Plan was a slipshod piece of work.

Dolores Carrillo is currently working in Luxembourg as a Spanish board member in the International Atomic Energy Agency.

This charge against CSN is added to those made previously by the World Information Service on Energy (WISE) and the L'Ametlla de Mar Anti-Nuclear Committee, which accused that agency of not being neutral in its actions by expressing opposition to the closing of the Vandellós nuclear power plant.

#### More Rigorous CSN Policy Described

90WP0023A Madrid *EL INDEPENDIENTE* in Spanish  
5 Jan 90 p 26

[Text] Madrid—As a result of the accident that occurred at the Vandellós I power plant on 19 October of last year, the Nuclear Safety Council (CSN) has initiated a series of internal reforms aimed at taking more forceful action with nuclear power companies, according to members of the technical office of this agency's chairmanship.

Included among the reforms planned is that of obliging nuclear plant owners to abide by the deadlines specified for making the changes in the plants ordered by CSN, and speeding up the reports prepared by the Council at the request of different agencies. These measures are added to those proposals already in the Council's job openings schedule, approved last September before the Vandellós accident. They consist of an increase to two in the number of resident inspectors at the power plants, and the assignment of a full-time technician in the Council's Emergency Room (SALEM).

A member of the newly created technical office of the Council's chairmanship remarked that, up until now, CSN has acted with "too much leniency," assuming a position marked by understanding and cooperation with the owners of nuclear facilities. In practice the policy granted periods of time for improvements by mutual agreement with the nuclear plant owners (he added), and if something was not adjusted, an extension would be proposed. According to another CSN technician, there is sometimes difficulty in setting a strict deadline, because the changes stipulated by the Council may not coincide with the improvement plan submitted by the energy companies.

The CSN technicians admitted having had a bad experience in the case of Vandellós I, a power plant whose owners failed to comply with a series of urgent measures

imposed by CSN, two of which (relating to fire protection and the cooling system) were implicated in the accident. It was precisely because some terms imposed in the final operating permit for the Tarragon power plant were not fulfilled, pertaining to the implementation of the quality control program and a physical protection system, that the CSN in 1986 proposed a penalty for the nuclear power plant to the Ministry of Industry.

Since the accident at Vandellós I CSN has been criticized by various sectors for not having forced it to meet the deadlines for the changes specified. For that reason, this agency, the only one in Spain with authority in the nuclear safety area, has decided to be more strict about the execution of improvements required of any nuclear plant from now on.

In the event of any major difficulties in being able to implement the changes within the specified time period, there will be an attempt to make the relations between the heads of the plant and the Council more expeditious and open, the spokesmen for the latter agency declared.

As part of this new policy CSN is increasing the number of job positions and contracting with engineering firms and agencies in other countries similar to the Spanish agency to collaborate in their research work.

CSN will send a new resident inspector to each power plant, who will be an assistant to the already existing one, making it possible to set up shifts and cover all the hours of the day year-round. At the Vandellós I plant there was no resident inspector at the time of the accident; this work was being done by the inspector at the Vandellós II nuclear plant, 500 meters away from the other plant. The assistant, who must be a specialist in radiological protection and liquid spills, among other things, will aid the current resident.

The Council also plans to assign a technician 24 hours a day in the Emergency Room (SALEM) located at CSN's Madrid headquarters, where there is now a guard on duty to notify all the specialists of any unusual incident that may occur. The SALEM, which is in constant telephone contact with every power plant in Spain, and with Civil Defense, the Presidency of the Government,

and other entities, has four rooms in which those responsible for making the necessary decisions can meet in case of a nuclear emergency.

## SWEDEN

### Nuclear Power Boards Discuss Greifswald Incident

*LD3001122290 Stockholm Domestic Service  
in Swedish 1030 GMT 30 Jan 90*

[Excerpt] [Announcer] Yesterday the National Nuclear Power Inspection Board [SKI] met with its East German counterpart to discuss an incident at a nuclear power station at Greifswald in the GDR. The incident occurred in November, but has only become known now. But, according to the SKI, the accident was nevertheless not serious enough for the GDR to inform Sweden.

[Unidentified correspondent] Yes, the Swedish Nuclear Power Inspection Board has met East German representatives to find out what actually happened last year at the Greifswald nuclear power station. In 1975 such a serious accident happened there that the staff feared a meltdown; this time the reactor shut down automatically when it failed to function, and instead, the rods were stopped manually after 40 seconds. But there are divided opinions about how serious the incident was. Critical GDR technicians believe the plant has serious construction faults, while a director of the East German nuclear power inspectorate described the incident as a trivial occurrence. In Sweden, Environment Minister Brigitta Dahl has described the reports from 1975 and last year as extremely serious; she has demanded prompt replies to questions. But she does not go as far as her colleague in West Germany, who is demanding that the East German reactors be closed until safety is guaranteed. But the Swedish Nuclear Power Inspection Board's director of supervision of Swedish nuclear plants, Jan Nystad, sees the worry as exaggerated. At no point was there a risk of radioactive leaks, and therefore East Germany was not obliged to report what happened to Sweden, Jan Nystad believes. [passage omitted]

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